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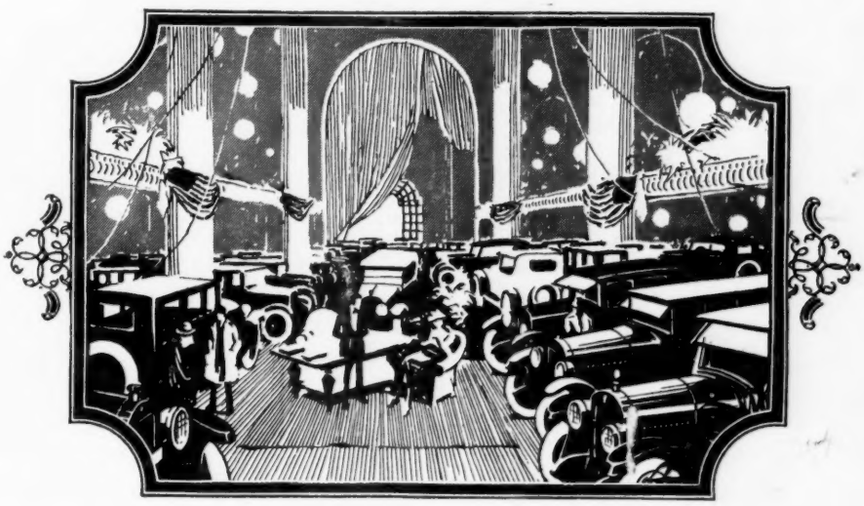

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AUTOMOTIVE INDUSTRIES
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VOL. XLVIII NEW YORK—THURSDAY, FEBRUARY 15, 1923 No. 7

Railroads Are Urged to Enter Highway Transport Field

Highly important policy decided upon by Truck Committee of National Automobile Chamber of Commerce. Reeves, as spokesman, declares railroad men are proper ones to take charge of truck and bus lines in coordinating transportation.

By James Dalton

MEN in the automotive industry are so close to the business of making and selling individual transportation that some of them may not have grasped the full significance of recent events which presage rather revolutionary changes in the nation's transportation system. The word "dramatic" might quite properly be used in a consideration of this subject.

Within a year the country has awakened with a start to the tremendously important part played in its business and social life by the motor vehicle as an agency of transportation. The change in sentiment since the period of deflation began in 1920 has been little short of astounding in this respect.

Steam and electric railroads had waged a bitter but losing warfare against the motor vehicle ever since highway transport became an important factor in the movement of freight and passengers. The fight of the traction companies was older than that of the steam carriers because the motor car carried many millions of passengers before use of the commercial vehicle became widespread, but it has been no more bitter.

AMAZING progress has been made within a year in the laborious task of coordinating all forms of transportation for the good of the nation.

This article outlines what has been accomplished as well as the policy which has been agreed upon by representatives of motor truck manufacturers.

Recent developments have been highly significant and will exert a profound influence on future methods of handling short haul freight and passenger traffic.

One of the most noteworthy developments of 1922 was the recognition by many of the electric lines that the motor bus is an important ally in their work and that it will be patronized by many persons who will not ride in a trolley car. They know now that it can be operated much more economically and efficiently in certain urban centers. They probably will continue to combat independent jitney and bus operators, but they have decided to go into the business themselves and try to stifle competition by giving better service.

An amazingly large number of buses was placed in operation last year by traction companies and more

are being purchased all the time. Thousands more will be placed in the streets as the rail franchises under which companies are operating expire. Many of the problems of the independents and of the street car companies should be practically identical. Both are interested in protecting buses from unfair and onerous legislation and taxation.

This constituted step No. 1 in the unification and coordination of two highly important transportation factors, but it has related chiefly to the movement of passengers.

THERE are substantial evidences that step No. 2, even more important, will be taken in 1923. It will be coordination of rail service with that rendered by highway transport. An almost unbelievable change in the sentiment of railroad executives on this subject has become apparent in the last few months and many of them are about ready to act.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, went to Detroit last week and made a somewhat startling statement in an address before the Transportation Club. A majority of those in his audience were railroad men and they were astounded when he said:

"Bus and truck lines have not all been successful, generally because of mismanagement or because of routes that furnished insufficient returns. ALL THIS MEANS THAT THE RAILROAD MEN ARE THE PROPER ONES TO TAKE CHARGE OF TRUCK AND BUS OPERATIONS, MAKING THEM FEEDERS TO THE TROLLEYS AND STEAM LINES."

When Reeves made this statement he was speaking for the motor truck manufacturers of the country as represented by the N. A. C. C. His address followed a meeting in Chicago at which it was decided this should be the attitude of the commercial vehicle branch of the industry. Passenger car makers, excepting those who produce trucks, are not directly involved.

This position has been carefully thought out. It may be open to argument and it is not likely to be accepted unreservedly by all automotive interests but it marks an important step in the business of coordinating transportation, as demanded by President Harding at the opening of the present session of Congress.

The N. A. C. C. does not believe that if the railroads generally adopt this proposal it will have cataclysmic effects. In the first place, the carriers are not expected to plunge into the market and buy enormous numbers of trucks. Those which try the plan will do so experimentally in the beginning. Much red tape which has been rolling up for years must be unwound and many changes in operating methods must be made.

WHILE experimenting in a small way on their own account, most of the carriers probably would contract with motor truck contractors to do the actual work at terminals. It is not believed that concerns big enough to operate trucks of their own would be particularly interested because they would find it more profitable to do the work themselves than to have the railroads or contractors do it for them. The Erie Railroad now has such a contract with the United States Trucking Corp. for store door delivery in New York.

Each railroad might employ the services of one trucking company or one big company might serve five or six roads. As the business developed, the carriers could gradually put in their own equipment at strategic points. If the railroads undertake the work they will want to be assured of a steady, year round business. They want it made possible to use a single freight bill all the way from consignee to consignor. Some of the advantages of motor truck delivery to and from the rail lines are:

It gives control of shipment.
It makes boxing unnecessary.
It provides regularity of shipment.
It insures a saving of time.
It permits manufacturing plants to get along with smaller inventories.
It permits merchants to replenish their stocks more quickly.

The position of the N. A. C. C. is that it is up to the railroads to put the system together and operate it. The aggregate of the business would be huge and the subject is worthy the consideration of the best minds in the transportation field.

From the standpoint of the automotive industry, the N. A. C. C. believes it would do much to stabilize the truck market by providing big buyers who would be able to arrange highly satisfactory credit terms and who would not be haggling constantly over allowances in trades. It is believed that trucks of all capacities would be used, from light delivery vehicles up to four or five tons. The assertion is made that it would enlarge rather than restrict the total of sales. Railroads, it is believed, would be inclined to buy from truck manufacturers close to the centers which would be served so they would be assured of satisfactory maintenance facilities.

GETTING into the question of the distance over which it is possible to operate trucks economically, the truck makers have taken no definite position. They do contend, however, that a large number of the 649 lines in the American Short Line Railroad Association, two-thirds of which are less than 25 miles in length, could profitably abandon their rails and handle their freight and passenger business over the highways by means of trucks and buses. Many of these roads are subsidiaries of larger companies.

While the N. A. C. C. has decided to undertake the task of selling the carriers on the idea of going into the operation of motor trucks to save for themselves the short haul, l.c.l. business, it has not yet mapped out concrete plans. This will be done slowly and deliberately because it is realized the task is one that will require time and patience.

In this connection it should be remembered that in his recent address before the Society of Automotive Engineers this statement was made by Elisha Lee, vice-president of the Pennsylvania system:

"The question arises whether a terminal trucking system of the kind we have been discussing should be operated by the railroad companies or by independent enterprises working in cooperation with them.

"This question would require careful study to be answered decisively, but in the light of present knowledge there appear to be at least two important considerations favoring independent operation.

"1—One is that the railroad business is already so vastly complicated that it is very debatable whether it is desirable to add another department, requiring expert knowledge, to the functions and duties of management.

"2—The other is that, if identified with the railroads in ownership, the trucking operations would be more likely to be subjected to hampering and restrictive regulation than if independent.

"Should there be a single trucking agency in each city, or several more or less competitive?

"The former seems to be the general rule in England,

where, by the way, the collection and delivery system appears to have been working out very successfully. For us I am not certain that the single or unified agency scheme is the best. Without committing myself definitely, I may say that there seems to be at least some good arguments for preserving a degree of competition and also for maintaining the identity, all the way through, of the services of the separate railroad lines. That identity would be largely lost if every shipper and consignee, in a given city, transacted all transportation business through the same local collection and delivery agency. On the other hand, if there were separate agencies, cooperating with each separate line of railroad, the identity and individuality of the various rail lines, and of their services, would be preserved."

IT is significant, nevertheless, that the Pennsylvania is making a scientific study of the motor truck to see where it can be used economically in the general movement of freight.

A view similar to that of Lee was voiced by W. H. Lyford, vice-president of the Chicago & Eastern Illinois at the highway education conference in Washington in October. He believes that the service should be offered by the railroads if it can be done most efficiently and economically by them, but if not by independents working in close cooperation with them. He advocates a cartage service at fixed tariffs and would have it apply not only to l.c.l freight but to carload business in congested terminals. It is his idea also that the short lines might with profit perform all their service with motor vehicles.

WHILE the position of the N. A. C. C. has been carefully thought out, it may not be accepted unreservedly by all automotive interests. It is believed, however, that if the railroads accept the proposal it will stabilize the truck market and that the service given will be accepted generally only by those shippers who do not operate trucks of their own. Much of the work will be done in the beginning, it is expected, by truck contractors. Many advantages are claimed for store door delivery of less than carload lot freight by carriers themselves.

These two great movements toward the coordination of transportation, the one well under way and the other just beginning, are the important effects of fundamental causes.

When business was booming ahead at full speed in the early months of 1920 there was a shortage of steel. Then came more or less reliable reports that steel makers proposed to curtail deliveries to motor vehicle manufacturers on the ground that they were turning out a non-essential product. Before this threat could be carried into effect, if it ever was seriously intended, one industry after another, beginning with silk, crashed up against a wall of sales resistance which would have caused the worst panic in the country's history had it not been for the Federal Reserve system, so vigorously opposed by bankers when it was proposed.

Then the bankers, who are the dictators in periods of depression, came forth with the edict that the motor vehicle was a luxury and as such was not entitled to serious consideration as a credit risk. It was an echo of a wartime wail and it was the last expiring gasp of the old theory that a motor car is a plaything. The truck was looked upon with a little more tolerance but the tolerance did not extend to the loosening of purse strings. As a matter of fact, when general business slowed up, a good many banks found themselves in the truck business and they didn't like it. This was nothing disgraceful, however, for many banks became huge department stores because of the necessity of selling for what they would bring all kinds of commodities taken over to protect the loans which covered them. Automotive plants slowed up and a good many of them stopped, especially in the truck branch of the industry.

Manufacturers stood with their backs to the wall, battling grimly. It is to their everlasting credit that only the weakest went down and even they fell fighting to the last. But 1921 was a comparatively lean year, just as it was for all business.

When 1922 dawned "fundamental business conditions" were good, just as they had been all along, but that was about as much as could be said. The industry went into the shows with hope but without confidence. Then, before any one realized it, the tide turned and ran in faster than it ever ran out. Passenger car manufacturers had the biggest year in their history and even the truck makers began to see daylight, in spite of cut-throat competition by the banks and the speculators who unloaded army trucks from abroad on the market.

All this is history but it is reviewed because of the remarkable change it produced in public sentiment toward an industry which has grown, without propaganda, pap or special privilege, into the biggest the country has. The production and sale of automotive products now plays a vitally important part in the lives of a large fraction of the nation's population.

Traducers of the motor vehicle have bowed to public opinion. It was the insatiable demand for the products of the industry which did more than anything else to restore confidence and set the wheels of general business in motion early in 1922. For this, if nothing else, the country owes the motor vehicle a debt of gratitude.

Bankers who contended less than three years ago that the motor car was a luxury, now frankly confess they were wrong. They are willing to back their changed views with credit. They have found the industry sound to the core. They concede that it is the barometer of business. Little is heard of the old bogey of a "saturation point."

THERE is no longer any question about the permanency of the demand for the motor vehicle. It has become established as a part of the warp and woof of American economic life. Not until something better as a means of individual transportation is developed will there be any falling off in sales.

The automotive industry and the railroads are agreed on fundamentals. Both accept the theory that short haul, less than carload lot freight, which the carriers long have contended was unprofitable, should be handled by truck. The chief controversy is over who should take care of the business and the distances for which truck operation is profitable.

Railroads long have contended that the movement by truck of short haul, l.c.l. freight must be profitable, while handling it by rail was a heavy burden because of terminal expense and various other factors. Their chief complaint has been that taxes wrung from them have been used for the construction of hard surfaced roads over which motor transport moved in unfair competition.

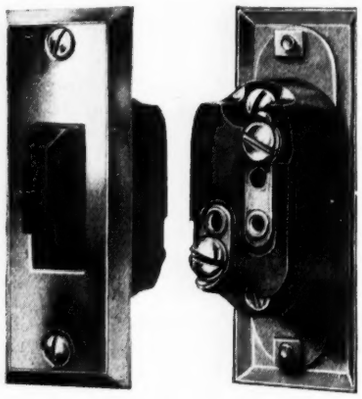
For years they assumed the attitude that the automotive industry was an upstart child which could be put in its proper place if it was pounded hard enough and long enough. They found, however, that this child had been adopted by the public from which they derive their sustenance and that it rapidly was becoming a fair haired family favorite. This child has grown so fast, in fact, that it has become the principal contributor to railroad revenue. Such being the case, it has been dawning upon the carriers that they can put motor vehicles to work to earn money for themselves and at the same time eliminate an unproductive service which various regulatory bodies would not permit them to abandon if they wished.

It took the railroads, traction companies and the financial interests back of them, longer than anyone else to realize that highway transport is destined to play an heroic role in the future of the United States. That realization has dawned upon them at last and they are likely to profit from it as much as they can.

They finally have accepted the viewpoint so patiently expounded by the automotive industry. That has been and still is, that there are certain forms of transportation service which can be performed most efficiently by the motor vehicle and that instead of clinging blindly to archaic methods they should adapt the new system to the public needs.

Two New Automotive Parts and a Shop Tool for Drilling Glass

TO its line of push button switches for automobiles the Cutler-Hammer Mfg. Co. has recently added a new slide button switch which is said to be particularly adapted for use on closed cars because the shallow construction obviates the necessity of deep recesses in the pillars. These switches are operated by means of a sliding button, which is moved up and down to close and open the circuit.

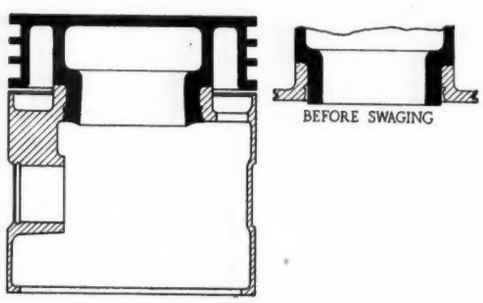


Front and rear view of new C-H slide button switch

The current-carrying parts are located in a heat-proof C-H Thermoplox insulation body, with the terminal screws at the back. Single pole as well as three-way types for use in connection with door switches are made.

New Composite Piston Design

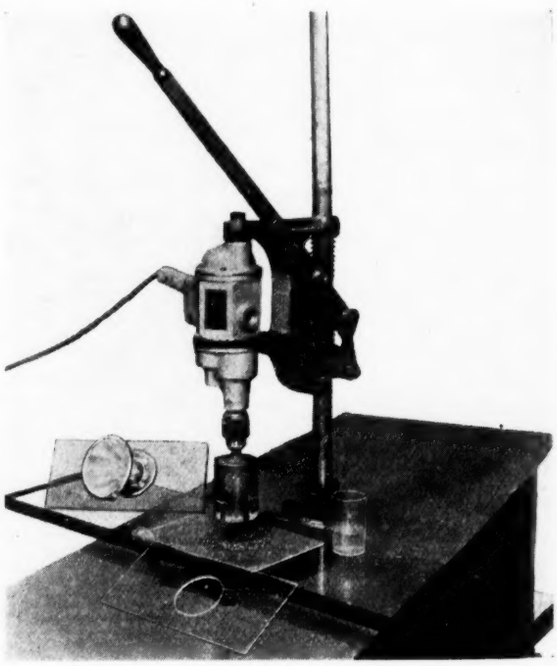
THE accompanying drawing shows a composite piston on which a patent has been obtained by L. R. Spencer of West Hartford, Conn. The head of aluminum alloy and the skirt of cast iron are held together by a swaged or expanded joint. The skirt is cast with an integral collar which is bored out, and the inner cylinder on the piston head is turned down to be a driving fit in this collar. The two parts are then forced together, and a taper pin with a set of rolls, similar to the tools used in swaging boiler tubes, is then introduced and the aluminum expanded into the cast iron. The rolling process tends to harden the aluminum and to give a very secure joint. The advantage of the composite construction is that the lightness and high heat conductivity of the aluminum in the head are combined with the good wearing qualities of the cast iron in the skirt.



Composite piston before and after swaging

Drilling Holes in Glass

THE accompanying photograph shows how large-diameter holes are being drilled in glass windshields for the installation of spotlights, which swivel in the glass of the windshield itself. The tool used is merely a brass tube which has been notched on the cutting edge, as shown in the illustration. The cutting is accomplished by means of a No. 60 carborundum compound made into a paste by moistening with water. This tube is attached to a disk, which is, in turn, carried on a ½-in. shank, held in the chuck of a portable electric drill mounted in a drill stand. The operation of drilling the hole in the glass requires but three minutes.



Drilling holes in glass by use of a brass tube in an electric drill

Designers and Service Men Agree on Need for Cooperation

To lower cost of transportation must be common aim. Designing from standpoint of cheap and easy servicing of prime importance. Advantages of flat rate service far outweigh drawbacks. No excuse for engineer who fails to consider service reports.

THERE is little difference of opinion between forward-looking engineers and practical service men as regards the necessity for better correlation of the activities of the two. Both agree that automotive design must give more attention to service considerations in the future than in the past. This was brought out clearly by B. B. Bachman, speaking from the engineer's standpoint, and J. W. Lord, representing the service view, in papers read before the Metropolitan Section of the Society of Automotive Engineers on Feb. 8.

Having recently retired from the presidency of the S.A.E., Bachman is peculiarly qualified to present the ideas of the engineer on the subject of service-design relationships. He said very definitely that "there can be no possibility of excuse for the engineer not taking into consideration service reports, no matter in what form they come to him." He added, however, that these reports are often conflicting and that considerable analysis is necessary if they are to be interpreted intelligently. There is a great need for establishing personal relations which will foster confidence between the service men and the engineer.

Bachman believes that the chief merit of the flat rate plan lies in the careful analysis of service jobs, service equipment and performance that is involved in the establishment of such a system. Advocates of the flat rate system would do better, he thinks, to emphasize this phase rather than the results to be obtained from the system itself.

Lord indorsed the flat rate system more fully, stating that he believed "flat rate service to be the most satisfactory method of selling maintenance and that it will become general."

He also pointed out the need for closer cooperation between the factory engineer and the service station. The production man, he said, is always at the elbow of the engineer, ready to advise him about the relation of design to production. It is more difficult for the service station to establish and maintain such contacts.

Lord favors the establishment of special service groups in factory engineering departments as a good method of keeping service contacts and improving design from a service standpoint.

Bachman's Views Concerning Service

Bachman said in part:

The need for service in the automotive field is such a self-evident proposition and has been commented upon so frequently that it seems unnecessary to do other than to indicate that the present writer thoroughly appreciates its importance. It would seem to be inconceivable that of all the individuals interested in the automotive industry, there should be any that could more correctly appraise the value of close cooperation with the service organization than the engineer.

There can be no possibility of excuse for the engineer not taking into consideration service reports, no matter in what form they come to him. It is only human nature that those suggestions which are presented in a helpful manner are most pleasant to consider. Recognizing this fact does not establish an excuse for neglecting to pay attention to information which may come in the form of querulous complaint.

Some Just Criticism of Engineers

With regard to details as to how this cooperative relationship shall be best established, it is exceedingly difficult to outline a method which will cover all requirements. It is self-evident fundamentally that, as with most other things, personal contact is the most efficient method. It is, however, to be recognized that it is too much to expect that the service reports will always be complete and accurate, or that the recommendations made should always be followed blindly.

Where the engineer can be justly criticized for his cold arrogance, the service man can frequently be criticized for the impetuosity with which he makes certain assumptions and supports them. It must, moreover, be recognized that very frequently reports from two different service stations are in direct opposition to each other, or it may be that alterations desired by the service department conflict with design requirements as dictated by sales or production. The engineer is, therefore, placed in a judicial position in which it is necessary for him to exercise his judgment in determining which of the conflicting viewpoints should be followed.

There are numerous ways in which the engineer can avail himself of information obtained from service stations. It is unfortunate, however, that most of these methods depend for their highest efficiency upon personal study and interpretation. Where an exceedingly large volume of reports are received and must be digested, it becomes impossible for one man to handle the details. The writer has found it exceedingly difficult to train junior engineers in taking the necessary critical pains in analyzing reports.

The matter of flat rate system has been discussed at great length, and while the writer believes that there are many features of merit in such a method, he is convinced that there are merits imputed to the system which it will be hard to justify on careful analysis.

The big value of the flat rate system lies in the necessity, in establishing such a system, of making a careful

LACK of personal contact with service station problems often results in failure to appreciate their importance and the need for remedying faults which render service more difficult and more frequently required than it would otherwise be. Designing engineers would profit greatly if they would occasionally spend a few days in the repair shop studying service problems at first hand. Nothing is so instructive as direct personal contact with the facts underlying any problem which requires solution.

analysis of operations and determining with accuracy and certainty the cost of the operation. Due to many conditions, it has been possible for service organizations to survive on a hit or miss basis of price-making, which would have been suicidal in the manufacturing end.

Therefore, if the advocates of the flat rate system, instead of placing emphasis on the results to be obtained from the system, would more strongly emphasize the preliminary investigations which must be made and the general business housecleaning which must be done in order to establish foundations upon which a successful flat rate system may be based, their purposes would be better served.

There has been a demand for cheap automobiles, but there has been little or no demand for economical automobile transportation, which is an entirely different thing; and it is extremely probable that the attempt to produce and market an automobile based on such premises would meet with commercial failure.

The engineer has been thinking for years about economy in operation, and is in possession of pretty definite information of the lines along which designs should be laid out to obtain this economy. It has never been possible, up to this time, to get these ideas into practical form because they would not meet with public acceptance.

There is no question, however, but that within a relatively short time an increasing public opinion will be coming into existence favorable to and demanding economy in automobile operation.

How Lord Views Service Problems

Some of Lord's more important statements were:

The real reason why service is becoming of such importance is: The public is demanding better, cheaper, and more prompt repairs, and showing preference for those who will give it to them.

Service stations must primarily do their utmost to keep the product on the road; whether this involves making the usual normal repairs or making emergency repairs, necessary because of faulty design, workmanship or material. It is repairs of this latter variety which demand much of service, particularly when a truck is involved. The job must be put on the road again with all possible speed.

It would almost seem that the more successful a service station is in making such repairs the less attention is given by the factory to the real cause of the trouble. Sometimes such difficulties are allowed to gain great headway, and when the engineer finally does realize that a serious condition has arisen, which must be taken care of, it can only be done at most heavy expense.

That such things can and do happen and can go on is difficult to explain. Perhaps many an engineer feels that the average service station loudly cries "wolf" whenever any difficulty, no matter how trivial, first appears. On the other hand, there is a feeling in the field that the engineers at the factory are inclined to be arrogant and obstinate; almost invariably taking the attitude that a difficulty is due to anything except design, material or workmanship. I believe this situation will disappear as the factory engineer takes more interest in service problems and comes much more closely into contact with service and maintenance.

The matter of selling repairs also deserves the attention and study of factory engineers. I believe flat rate service to be the most satisfactory method of selling maintenance, and that it will become general; the rate to cover the finished job, both labor and material.

The factory engineer should be interested in repair tools and their application. He should be interested in accessibility. These are not problems to be dismissed by taking the attitude or presenting the argument that it is undesirable to build vehicles which every tinker can readily take apart or put out of order, and which come apart so easily they will not stay put. These are problems in design in which the engineer should be so interested as to give them equal consideration along with design from a performance and production angle.

The matter of repair parts also holds much of interest for the factory engineer. Prompt repairs usually involve having the necessary repair parts on hand. This involves carrying parts for the current cars and for the older models as well, and leads to a heavy inventory of many different parts. A study of applying later parts to earlier models will often result in effecting many substitutions all tending to simplify the stock and make it more effective.

We hear much about pirate parts and substitute parts and in the same breath that they are far inferior to the genuine article. The fact remains that the makers of these parts are doing a growing and flourishing business. Here and there the question is raised as to who are the real pirates. This matter of high priced repair parts places the service station, using genuine parts, at a decided and sometimes ugly disadvantage with the repair shop buying other than genuine parts. No one likes to be unjustly charged with extortion and realize that high material charges are driving away good customers.

It is only natural and to be expected that the factory designing engineer is fully in accord with design from a production viewpoint as well as that of performance. Production interests are right at hand. The production engineer is always at his elbow, continually showing him how slight alteration of design will not affect performance but will simplify production and reduce costs. By virtue of this continual contact the designing engineer becomes quite a production engineer himself.

Maintenance and repair on the other hand have been afield; they have not been physically close to the engineer.

Some manufacturers have developed an engineering group in their service departments. Such a group can closely follow the performance of the company's product in the hands of its customers. I believe all this good organization is a step in the right direction.

I believe the designing engineer needs this intimate contact with service, and that the factory management, which will see to it that its engineers get this intimate contact with maintenance, will be amply rewarded by a product which will give less trouble in the hands of its owners, and one which can be maintained at less expense.

I think that there is a tendency to hold the designing engineer much too close to getting out the department drawings so that he becomes not much more than a chief draftsman. I suggest an organization involving an assistant executive engineer who can push the department work along giving the chief time to get away and secure first hand knowledge of maintenance, repairs and service station problems.

Discussion

The discussion centered largely around flat rate service, a majority of the speakers holding the view that the advantages of such a system outweigh by far the disadvantages. It was recognized, nevertheless, that there are certain difficulties which must be met in the successful operation of flat rate methods. The following written discussion, submitted by J. G. Vincent, vice-president in charge of engineering of The Packard Motor Car Co., is of interest as reflecting the view of one prominent engineer who has given the matter of flat rate service careful consideration:

I think Mr. Bachman is absolutely right when he states that one of the biggest values of the flat rate system of service charges lies in the necessity for carefully analyzing service operations from a cost viewpoint. To this I would add a corollary to the effect that such analysis in any line of business almost invariably results in a big gain in efficiency, which in this particular case of course would mean a lower cost of service to the vehicle owner.

I am inclined to doubt that the averaging of costs over the car which is taken care of and the car which is neglected is any worse from the owner's viewpoint than the fact that on a time and material basis the vehicle owner lucky enough to draw the fastest men in the service station has an advantage over those less fortunate. In addition, of course, the man that takes care of his vehicle will not be in for the work as often as the man who neglects his vehicle. As a matter of fact, the vehicle is designed in the first place on the basis of averages plus the proper factor of safety of course.

Design Meets Average Conditions

By this I mean that the vehicle is designed as nearly as possible to give good all-around results whether operated in the country or in the city, in the North or in the South. in the mountains or on the plains, by the hard driver or the easy one, all of which means that every owner sacrifices a little so that the other owners with other operating conditions may also get satisfactory results. Obviously, if the vehicle were designed to fit only one set of conditions somewhat better efficiency could be expected under those particular conditions, and of course the reverse would be true under other conditions unless several types of the same vehicle were produced. As I see it, the flat price system of servicing which handles costs along the same lines—that is, on broad general averages, is perfectly fair, therefore, and not only is a more businesslike method of doing business but also one which promotes efficiency throughout the relations between the service station and the vehicle owner.

As I see it, Mr. Lord has covered the subject in excellent shape. In fact, I can go further and state that our procedure at the Packard company has been a good deal along the lines of Mr. Lord's paper.

As an example of this—approximately five years ago we organized a separate division in our engineering department to handle service field problems from an engineering viewpoint, and it is to service field suggestions, properly analyzed and checked, that a great deal of our current model refinements have been due. Naturally, this department has been very close to the laying down of new vehicles to avoid the possibility of repeating on previous service field conditions.

It is, of course, true that a great many service field suggestions do not successfully stand investigation and this Mr. Lord refers to on the basis that the service station may frequently cry "wolf." On the other hand, those which are substantiated more than offset the time lost on the other variety.

Along the same lines, the matter of accessibility of parts and units has been given very careful consideration and very definite advance has been made again largely as a result of our contact with the service field.

NO flat rate system which is not based upon a careful analysis of the cost of performing the various operations involved in service can hope to be successful. Such an analysis is, in fact, one of the most valuable things about flat rate service. It has established definitely the cost of many operations, the cost of which was heretofore often mere guesswork. The good guesser made a fair profit. The poor guesser either lost money or overcharged the customer. A sound flat rate system is fair to both the customer and the service man and is more apt to succeed than any hit-or-miss system.

Our technical service department, which handles the business negotiations with the service field, tells me that the flat rate system of service charges is now in effect in our service stations and has given an excellent account of itself. In addition, it is stated by that department that the system has been recently improved by making the flat rate uniform throughout the country according to three zones which appears to me to be very logical.

In that same technical service department service or repair tools are being developed from suggestions from the factory organization, or from the service field and made available to the latter, and equal attention is being given to the proper ratio of vehicles to quantity of service stock, so that each service station may carry the proper amount. In addition, the actual retail prices of the service parts are continually being scrutinized to keep them fair and proper.

Naturally, the engineering department is assisting the technical service department continually in all of these matters, and there is no question but that the procedure is more than warranted.

A letter from A. J. Scaife, engineer of The White Co., dealt largely with the desirability of closer contact between the engineering department and service station, dealers and users of the products for which the engineering department is responsible. Scaife said his concern has profited greatly by the reports brought in by representatives of the engineering department who are charged with keeping in close contact, not only with service men, but with dealers and users.

A written discussion submitted by O. E. Hunt, chief engineer of the Chevrolet Motor Co., indicated that conditions are changing for the better in respect to the closer contact between engineering and service departments. The factory now recognizes the greatest importance of such contact.

Good Service on Buses Essential

R. E. Fielder, chief engineer of The Fifth Avenue Coach Co., read a discussion in which he stressed the importance of thorough going service in connection with the operation of buses. It is essential, in connection with a service of this kind, said Fielder, to have one's own service facilities. Inspectors should be provided to go over with the operator, at the end of the day's run, any troubles which he may have experienced with the vehicle. It is desirable to have specialists who concentrate on certain groups of parts and who consequently become especially efficient in performing them. A master record sheet of the repairs required should be kept for each vehicle, and this should be analyzed at intervals by the engineering department.

Fielder stated further that in his experience the production department cares but little about the factors which control serviceability. They are inclined to consider only

the matter of first cost without due regard as to what this may involve in servicing the vehicle. Buses frequently cover as much as 50,000 miles per annum, said Fielder, and if a fraction of a cent per mile can be saved by so constructing them as to facilitate service, the added first cost which is sometimes necessary is easily offset many times over during the life of the vehicle.

David Beecroft, past president of the Society, indicated that the use of the flat rate system has been instrumental not only in creating better feeling between the service station and user but in bringing about better feeling between competing service stations.

Mr. Manley, another S.A.E. past president, emphasized the importance of more efficient organization within the service station, and mentioned the need for absolute integrity if the confidence of car users in general is to be maintained.

Various men connected with service stations in and about New York City expressed the view that engineers do not avail themselves of first-hand information concerning the problems which the design of their product is responsible for in the service station. As proof of this, it was stated that very few engineers who visit New York seize the opportunity of visiting the local service station, handling the particular makes of cars or trucks for which they are responsible, although these service stations are about the largest in the country.

The need for greater standardization and for better tools designed to expedite repair work, were among other points brought out in the discussion. Frequent changes, resulting in a great multiplicity of repair parts, in which too little attention is paid to standardization, is another factor which increases overhead and causes delay.

One speaker said that the factory service department often acts as a buffer between the service stations and the engineers, apparently failing in many cases to impress the engineering department with the serious situations which are encountered in connection with such work. It is understood that it is impossible for the chief engineer of any company to personally analyze the numerous service reports submitted from time to time, but the need for having these reports carefully analyzed by members of the engineering staff who are in close touch with the chief engineer, is of great importance.

It appeared from some of the discussion, that personal contact and first-hand knowledge of difficulties encountered in the repairshop is seldom acquired by engineers concerned with design. In this connection, Bachman stated that an organization which sells exclusively through branches is in a better position to keep in close contact with service problems than one whose sales are handled through distributors.

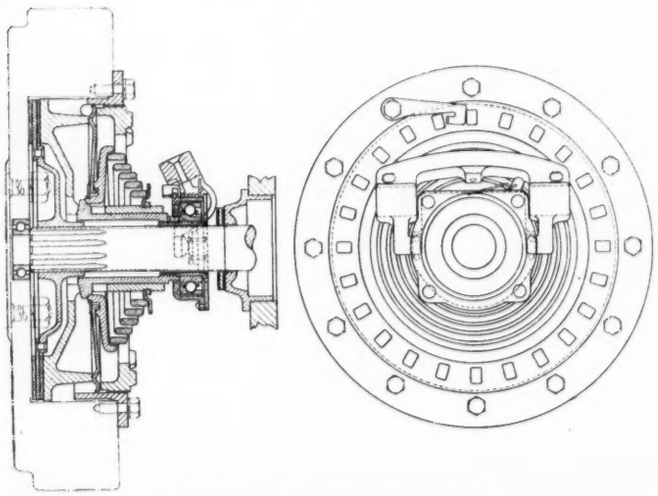
One service manager, in speaking of the flat rate system, stated that it not only brings about a better understanding with customers, but also brings the service manager in closer contact with his men and enables him to determine which of them are doing efficient work and which are failing to keep within the flat rate schedule.

In general the discussion appeared to indicate that service conditions are rapidly improving, and that there is a commendable desire for better cooperation between service men and the engineers of the factory organization.

Brown-Lipe Announces New Single Plate Clutch

A SINGLE plate clutch was announced recently by the Brown-Lipe Gear Co. The driven member consists of a forged steel, splined center with four saw blade steel sectors riveted to its periphery. The sectors are spaced slightly apart, and therefore have a chance to expand without distortion when they heat up in service. The hardened splines on the hub provide a durable connection with the transmission shaft.

The pressure plate is cast with a heavy circular rib, which imparts great rigidity to it. When the clutch is released, this pressure plate is pulled away from the driven plate. The point in which the new clutch differs most from other designs is the number of levers employed, which is twenty in this clutch as compared with three or four in most others. The use of such a large number of levers causes the clutch pressure to be distributed evenly over the whole friction surface, thus insuring even wear and long life of the fiber disks, it is claimed.



Brown-Lipe single-plate clutch

The release bearing sleeve is free of the clutch shaft, hence there is no chance for binding or seizing at this point. The housing transmits motion from the release yoke to the bearing, and has a universal action that prevents binding of the bearing. This housing also incloses the bearing and provides a reservoir for lubricant. It is claimed that, since all parts except the driven plate and fiber disks are under spring pressure, the clutch will not rattle. Minor advantages include a spring controlled stop finger for holding the clutch in release during adjustment, and a spring lock to hold the ring in its adjusted position.

The single concentric volute spring bears against a spring carrier which bears in turn against the inner ends of the 20 radially placed levers. The levers have their fulcrums near their outer ends which bear against the adjusting ring threaded into the flywheel ring. Turning the adjusting ring controls the position of the fulcrum and permits of compensation for the wear of the facings.

The release bearing is a radial thrust type. The adjustable ring is provided with stops, engaging the end of a flat spring which locks the ring in the desired position. To disengage the clutch the throwout yoke presses against the release bearing housing. This in turn pulls backward the bearing sleeve, the pressure plate sleeve, the spring carrier, the clutch levers and the pressure plate.

The friction faces are approximately 10 in. in diameter by 1½ in. face. The clutch is applicable to flywheels designed for clutches of the single plate type, and is intended for use on either passenger cars or trucks.

Time Has Come for Sale of Trucks to Southern Farmers

Conditions in rural sections point to most profitable year since 1919. Manufacturers, distributors and dealers should unite in sales effort. Much missionary work must be done. Actual demonstrations best.

WITH conditions on the farms of the South pointing to the most profitable year since 1919, and with the farmers holding more money than they have had for the past three years, the time seems to be at hand for truck and tractor manufacturers, distributors and dealers to make a concerted drive to sell trucks and tractors on a much larger scale than ever has been attempted in the rural districts of the South.

In Alabama, Arkansas, Mississippi, Tennessee, North Carolina and Louisiana crops made in 1922 paid better than in many years. Particularly is this true of North Carolina, Arkansas and Alabama, in the order named. In Georgia and South Carolina the boll weevil cut down the production of cotton, but the high prices obtained for most farm products made up for this deficiency to a considerable degree.

The prospects for 1923 are the most encouraging from the point of view of the cotton farmer that have obtained in a number of years. They are able to command a good price for their crop because estimates of the world supply indicate a shortage at least thirty days prior to the harvesting of the 1923 crop. If the farmers are unfortunate in having great damage from the boll weevil and the weather conditions are not favorable, or through other causes they make a small crop in 1923, they are practically assured a runaway market. In any event they should have a profitable market year for their cotton crop. The marketing bureaus and well-informed cotton men throughout the South are advising that an effort be made to produce in the neighborhood of 12,000,000 bales, as it is figured that there will be a ready market for this number.

Gain in Bank Deposits

The banks throughout the rural sections of the South show great gains in deposits, as well as the city banks, and this is a sure indication that the farmer is carrying over more working funds than has been the case in at least three years, although many of them have had to pay out a great deal on debts and some are still heavily loaded with obligations brought over from 1920 and 1921 crops. There are a great many farmers who were able to finance their planting and cultivating expenses during the 1922 season in cash, however, showing that they should be in excellent financial position at present.

The beginning of the 1923 planting and cultivating season is an excellent time to get started after the farmer's business in both passenger cars and trucks. A great deal of missionary work will be necessary to sell very many tractors to the farmers of the South, but it should be started this year.

The type of truck best suited to use in the South is of particularly sturdy construction, with considerable power, and at the same time very light, and not built to carry more than a ton and a half or two tons.

Naturally the farmer is a much harder customer to reach than the man in or near a city or a point in which trucks are sold. Methods of selling trucks to the farmer should, therefore, be thought out carefully, particularly as to advertising, methods of publicity and demonstration.

Selling Methods

Demonstration seems to be the method by which the most farmers can be reached successfully, and with the lowest cost. In demonstrating to them, general shows of what a truck can accomplish for the farmer should be given. This could be accomplished by getting the permission of some well-known farmer in a community to help him with the excess work on his farm during the months of February, March and April. Almost any farmer would be glad of a lift during these months.

After all arrangements have been made, thorough publicity should be given the event throughout the neighborhood and all the farmers who can possibly spare the time should be urged to attend, as many of them as practicable being offered help later. In this way a number can be gotten together for a demonstration and many of them can see the advantages of a truck. A follow up of this general demonstration should be made with all who attend it.

If trucks ever are to be sold to the farmers of the South in large numbers, this is the year in which the work should begin. An example of missionary effort in the way of selling trucks and tractors to farmers is found in the demonstration farm owned and operated by the Long-Lewis Hardware Co. of Bessemer, Ala.

This concern operates a permanent farm of seventy-five acres for demonstrating Fordson tractors, Ford trucks, and specially designed implements for the use of farmers. T. R. Copeland, head of the automobile department, is in direct charge of this farm, and has the following to say about its success:

"Our idea in cultivating the seventy-five acres we employ as a demonstration farm is to help the farmers of Alabama and the neighboring States find the proper machinery for use on their farms. The Southern farmer has had a number of things that more or less prevent the use of modern farm machinery on a large scale. We are trying to overcome some of these obstacles for them and where this is impossible at present we are endeavoring to adapt other implements to their use.

"For instance, we can plow out twenty acres of corn in less than a day's time with a tractor and two two-horse cultivators. We can work our water-melons and sweet potatoes so quickly that we hardly notice the trouble.

"We find that the farmers are very much interested in this demonstration work. They go down whenever they come into town and look it over, in order to see if there is anything they missed the last time. Our sales of farm implements have been increased to a large degree and we are pleased with the results both as to making money and in helping the other fellow."

This idea would probably be almost impossible to handle for a number of concerns and yet it contains a suggestion that can be worked out by most of them. The suggestion is that of general demonstration on the other fellow's farm. Working with some of the local dealers in the rural sections it might, also, be possible to locate farms owned by the dealers themselves and through the proper handling of the equipment they sell it can be made into a demonstration farm, possibly to the benefit of all concerned.

Another recent event that may contain an idea for the sale of trucks in the South is the gift by the Negro farmers of Alabama and their friends of a fully equipped "movable school" to the Federal and State Agricultural Extension Service. This truck was bought with donations from Negro farmers and a few others, collected by T. M. Campbell, a graduate of Tuskegee Institute, and in memory of Booker T. Washington.

This truck is fully equipped for demonstrations of home economics and good farm practice and includes in its equipment a moving picture outfit. This picture outfit is used for showing films that will help the farmer become more efficient in the handling of his farm and the farmer's wife in handling the home duties. Certainly trucks, tractors and kindred equipment should be shown in these films.

The fact that this truck has been put into operation suggests that other trucks can be sold for the same purpose and that through this means it might be possible to sell farmers trucks for their own use.

If the truck manufacturers are interested in further developing the Southern farmer market, they should get busy this year, as the time is ripe for the Southern farmer to see the advantages of trucks. The roads of the South are being developed to such an extent that it will soon be possible to use trucks in almost any section, with a reasonable degree of efficiency.

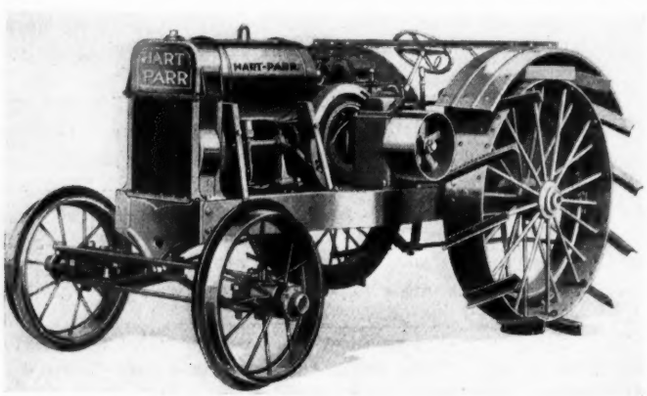
Detailed Changes Made in Hart-Parr Tractors

Refinements made in both the 20 and 30 hp. models to improve the operating efficiency and increase the life of the tractors.

NUMEROUS minor changes in design have been made in the Hart-Parr tractor and its engine which are said to have resulted in reduced weight, improved operation and increased life of the tractor.

The frame is now made of 7-in. channel steel, instead of a steel casting, and the engine is secured to it by six long anchor bolts extending through the engine base and the frame channel. The radiator now comprises cast-iron top and bottom tanks and a cast-iron frame, together with a tubular copper core. The front axle has been strengthened and its connection to the frame rendered more flexible. The rear axle bearings have been increased in size and provided with larger thrust flanges. The bearings are bored out eccentrically to permit of close adjustment of the driving gear mesh.

All bearings not lubricated by oil under pressure are lubricated with grease by the Alemite system. The operating speed of the mechanical lubricator has been reduced, and the lubricating system has been generally revised. The water pump is now mounted on the governor shaft and runs at engine speed, the drive being by gear. There is only one threaded stuffing box, and the pump shaft consists of bronze.



Latest Hart-Parr tractor

The gear shifting arrangement has been simplified and the shifting lever is now mounted rigidly on top of the gearbox. The band clutch has been redesigned for quick release and the clutch cone is now case hardened. The differential shaft has been provided with an improved intermediate bearing, insuring a more rigid support. The centrifugal governor is now provided with ball thrust bearings and operates in an oil bath. When wear occurs in this governor it has a tendency to decrease rather than increase the speed of the engine, thus preventing engine racing. The governor linkage now comprises ball joints with automatic spring take up. The hardened throttle valve shaft operates in bronze bushings of extra length, with their ends sealed against dust. The camshaft and governor shaft bearings operate in an oil bath.

The valve mechanism of the engine is now enclosed and operates in an oil bath. The pushrod and rocker arm assembly is enclosed. The pushrods consist of larger diameter tubing with case-hardened ends. Means for adjustment are provided in the form of threaded sockets in the end of the rocker arms. Valve springs are made of vanadium steel. The pipes of the kerosene shunt are now made of copper and are shorter. The transmission case has been redesigned; its whole top can be easily removed for inspection, etc., and all parts run in oil. The fuel tank still has 23-gal. capacity, but there is a gasoline compartment of 1½-gal. capacity at one end for starting purposes, eliminating extra tank on fender.

A roomy platform is built in the channels of the main frame, providing ample leg room for the operator while seated and plenty of space to move about in when the tractor is operating. The internal gears on the drive wheels are protected by a heavier shield, which is rigidly bolted to the main frame. The drive wheels are adapted to a variety of lug arrangements.

Motor Truck Performance on Grades Influences Highway Design

Tests made by Michigan State Highway Department indicate 2 per cent as most efficient grade for gravel roads and 3 per cent for concrete. Use of brakes going down hill lessens fuel consumption. Data to be used in future road building. Automotive industry has direct interest.

RECENT tests made by the Michigan State Highway Department in connection with motor truck performance on grades brought forth the following conclusions:

1. For surmounting a fixed rise in a given distance, the use of a grade at which the trucks operate most efficiently for the longest distance possible will give a minimum of fuel consumption. This grade for a gravel surface is a little over 2 per cent, and for a concrete surface a little under 3 per cent, for the three-ton trucks used in the experiments.

2. Use of brakes on down grades materially lessens fuel consumption, as compared with the use of the engine as a brake. To insure a safe descent, brakes should always be used.

3. Grades with safe alignment and the maximum steepness commonly found around Detroit need not be descended with the engine in gear if the brakes are in good order.

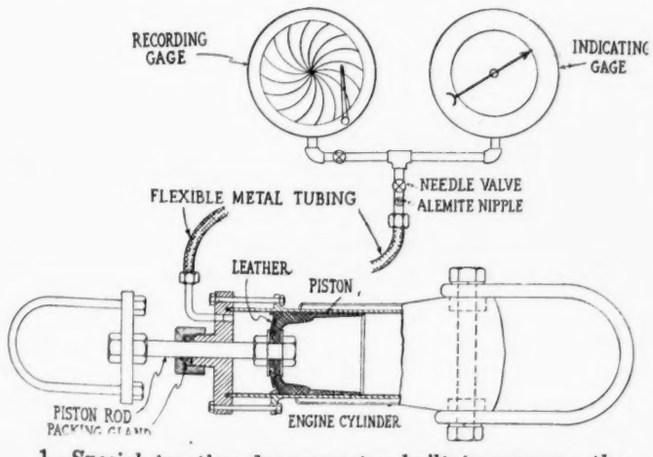
4. Where trailers are likely to become a large factor in transportation in the near future, grades should be limited to about 3 per cent. With trailers the speed of the vehicle would be reduced about 30 per cent.

5. Where trucks alone need to be considered, and a considerable volume of truck traffic may be expected, grades should be limited to 4½ per cent, unless they are of comparatively short length.

6. Hard surfacing (concrete) virtually reduces the grade by 0.78 per cent.

These results and the methods by which they were obtained are of very direct interest to automotive engineers.

In the design of highways the question arises as to how much money it is advisable to spend for leveling grades. Evidently, if all roads were absolutely level, cars could be built somewhat cheaper than is actually the case, as they would not require such powerful engines, brake gear, etc. Moreover, the cost of operation would be less, as the cars would consume less fuel and oil and—since their average speed would be higher—such cost items as driver's wages and fixed charges would also be lowered, if reduced to a ton-mile basis.

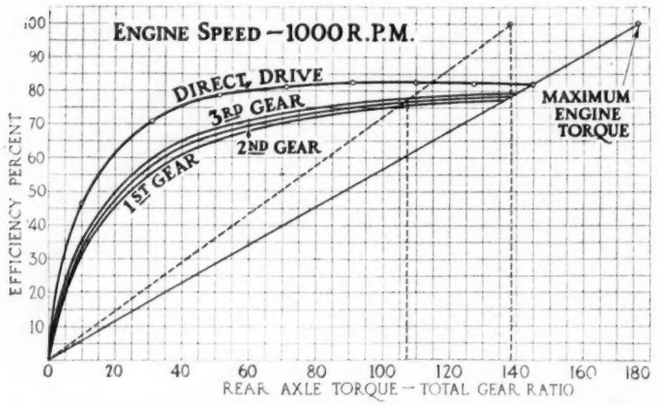


1—*Special traction dynamometer built to measure the drawbar pull on grades*

Rules in Respect to Maximum Grades

To create a basis on which to determine the best rules to follow in regard to maximum grades, these tests by the Michigan State Highway Department bearing on the fuel consumption on various grades were made. They include both up and down hill, the time consumed in traveling given distances over the grades, and the excess power available at the rear axle which might be utilized for hauling trailers. Rather than make use in the tests of a variety of trucks of different makes and capacities, the committee in charge of the tests, which consisted of Victor R. Burton, district engineer of the department, and Walter E. Lay, Assistant Professor of Mechanical Engineering in the University of Michigan, decided to use a three-ton truck, and all tests were made with four trucks of the same make of this capacity. A preliminary report on these tests has been issued by the State Highway Commissioner. The make of truck with which the tests were made is not given, but it appears from the specifications published that they were Packards.

Three sets of tests were made. The first were engine tests, to determine the horsepower, mechanical efficiency, torque, brake mean effective pressure and fuel consumption under wide open throttle over the speed range 500 to 1300 r.p.m. The fuel consumptions for one-quarter, one-half and three-quarter load were also determined for this speed range. The inlet manifold depression corresponding to different speeds and torques was also determined, this making it possible to tell the horsepower developed by the engine in the road tests by merely reading the tachometer and the inlet manifold depression. The data obtained from the four engines were combined in a single chart representative of the average performance of the engines. Calorimeter tests were made of the fuel used in the tests, and the average result was 19,767 calories per pound. The specific gravity of the fuel was 0.7455. The average idling speed of the engine, which is of some importance in connection with the use of the engine for braking purposes, was found to be 474 r.p.m. It was found that when coasting at the governed speed it made little difference whether the ignition was on or off, as



2—Transmission efficiency of the truck at 1000 r.p.m. engine speed for various rear axle torques

only few charges are ignited early enough to produce any appreciable power.

Next, tests were made to determine the efficiency of the transmission from the engine to the road wheels. This was done by taking off the road wheels, jacking up the rear end of the truck and connecting the axle shafts to an electric dynamometer each. In this way the transmission efficiency was measured for each truck for speeds of 500, 700, 900, 1100 and 1300 r.p.m. and for ⅛, ¼, ⅜, ½, ⅝, ¾, ⅞, and full load for each speed. The power input to the transmission was determined by observing the manifold depression and then refering to the charts of engine output. Charts were then drawn of the transmission efficiency, one chart for each engine speed. Efficiency tests could be made only on direct drive and third speed, as the dynamometers were not sufficiently large to measure the torque on the first and second gear, but the efficiency on these lower gears was approximated after careful study of existing data, and each graph shows transmission efficiency plotted against rear axle torque for all four changes of gear.

Tests for Resistance and Fuel Consumption

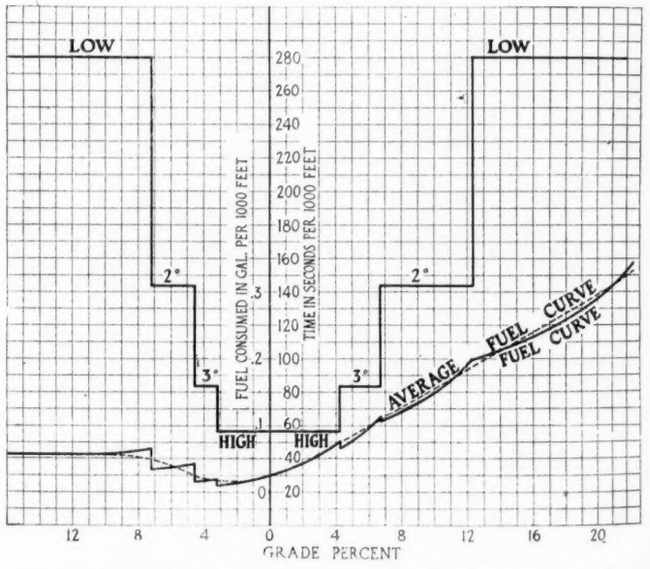
In the road tests it was necessary to make determinations of the instantaneous total resistance and the instantaneous fuel consumption, for the reason that grades are never uniform for any distance. A special type of traction dynamometer was constructed from a Liberty aircraft engine cylinder in which a piston was inserted in the reverse way and the piston rings were replaced by a leather washer against the piston head. The open end of the cylinder was clamped against a header, a piston rod fastened into the piston head passing through a stuffing box on this header. The space between the piston and the header was filled with transmission oil, and a tube connected the header to two pressure gages, one indicating and the other recording. A needle type throttling valve was placed in the oil line between the dynamometer and the gages. It was found that the drawbar pull fluctuates violently, even on comparatively smooth pavements, and the use of the throttling valve prevented surging of the gage hands, permitting of a fairly accurate reading of the indicating gage and giving a clearly defined line on the chart of the recording gage. The fuel consumption was measured at every station, both up hill and down, by means of a Brown & Barlow flowmeter. This was adapted to the conditions in this case by substituting small diameter glass tubes for the large diameter glass pipe, whereby it was made more responsive to rapid changes in fuel flow. The speed of the truck was checked between 100 ft. stations by means of stop watches, and the speed of the engine was determined by a Van Siclen tachometer.

The road tests were made on a gravel road north of Clarkston, Mich., built in 1919 under the State reward plan, varying from level to an 8 per cent grade, and on a concrete road south of Pontiac, varying from level to 6 per cent grade. The trucks were operated with the engine in gear both up and down grade, the engine serving as a brake when going down hill.

Effect of Grade on Fuel Consumed

It is easily seen that the fuel consumption of the truck is greatest when climbing the maximum possible grade with throttle wide open. It decreases with decrease in grade to the point where the down hill grade component is driving the transmission system and power plant, at which time the throttle will be closed against the idling stop. If the decline becomes still greater and the brakes are applied to maintain constant speed, the fuel consumption will not be increased. If, however, a shift be made to a lower gear, the fuel consumption will be increased. The greater gear reduction decreases the torque driving the engine, making it necessary to open the throttle considerably. As the down grade becomes greater the throttle may be closed until the truck coasts, when the throttle is again closed to the idling stop and the fuel consumption is at a minimum for that gear.

The minimum fuel consumption on the gravel road was on a decline of 4.03 per cent and on the concrete road on a decline of 3.25 per cent.



3—Variation in fuel consumption per 1000 ft. on concrete roads with different grades

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MANUFACTURERS of taximeters will find a ready market for their product in Mexico City, if their prices compare favorably with those of French make, which are reported as selling at from 110 pesos up to 175 pesos, is the advice to the automotive division of the Department of Commerce by Consul General Dawson.

An unusual demand for taximeters exists because of the recent advent of taxicab service in Mexico. The Yellow Taxicab Co. has just inaugurated a taxicab service. Another American company will soon open up with twenty cars, he reports.

Previous to the inauguration of these taxicab companies which have taximeters, chauffeurs of public cars charged any price they thought the traffic would bear, on an hourly basis. The taximeter cabs, however, have proven cheaper and more satisfactory, with the attendant result that all service automobiles are purchasing taximeters.

Building Better Dealers Important Job for Factory Sales Managers

Methods used in other industries offer suggestions. Flying squadron of "business doctors" may be necessary. Market analysis should be started at factory. Sound basis needed for territorial quotas. Dealer finance problems acute.

DEALER education is an important part of factory merchandising. Anything which will make the retailer a better merchant means larger sales for him and bigger profits for the manufacturer. While the full importance of this point may not be generally understood, the last few months have brought a material increase in constructive cooperative efforts.

A few factories are working out rather elaborate plans along this line. They are saying little about what they have in mind for the programs they are perfecting are original with them and somewhat expensive. For that reason they don't want to give the industry generally any advance information about the machinery they are setting up for they can't patent it. Some of these plans, however, contemplate the establishment of retail merchandising schools.

Even if a company cannot afford the expense of elaborate dealer education campaigns, there are a thousand and one things they can do which will be helpful to their retail organization.

There may be a lesson in the system evolved by a company which distributes drugs on a national basis. This company selects its dealers carefully. It tries to assure itself in advance that they are both business men and salesmen. Once a contract is signed the company tries to keep the dealer functioning efficiently. This is less expensive than obtaining and educating new dealers.

The company has made a fairly close analysis of the sales possibilities of every town in which it has established a store. The sales records of every dealer are carefully scrutinized and if he falls far behind the mark which he can reasonably be expected to hit, the company tries to find out why.

FOR this work it has a staff of experts. These men are sent out to interview the dealer. They point out to him that the company wants to help him make his business profitable and they gain his whole-hearted support of their efforts to find out why he isn't doing as much business as he should. They go over every department of the store and make a careful analysis of it. They learn that while some departments are returning a substantial profit, the merchant may be merely breaking even or suffering an actual loss on others.

The investigators try to find out exactly why these conditions prevail and usually they succeed. They locate the leaks and show how they can be plugged. They make a complete report, the merchant has confidence in them and he is glad to put their recommendations into effect. The results are beneficial both to the wholesaler and the retailer.

If a motor car company could organize a flying squadron of this character it could give substantial and practical assistance to the sick dealer. It could determine whether his lack of success could be attributed to factors which could be controlled or whether he was so lacking in business and merchandising sense that success was impossible.

EVERY manufacturer has traveling representatives whose chief duties are to sign up new dealers and sell more cars. Just at present a good many of them are devoting most of their time to the quest for dealers. Might it not be more profitable to convert some of these travelers into business doctors or find men who could serve effectively in this capacity? Each company knows its own business best and that is a question each must decide for itself.

Unless a motor car dealer is wholly unfitted by experience or mentality for the work he has undertaken, failure to succeed, even in a moderate degree, is attributable in almost every instance to lack of merchandising knowledge or some leak in his establishment. If there is a leak it may be due to used cars, service, service parts, inefficient employees or any one of a score of things.

A factory man who knows the factory problems and who has had successful retail experience can go into that establishment and locate the leak without difficulty or he can determine the ways in which the dealer falls short as a merchandiser.

It simmers down for each company to a question of men and money. There is no company which is not spending a certain amount to promote sales. If it is striving for national distribution much of its appropriation for this purpose is going into the work of signing up additional dealers. The natural query is whether this money could not be spent more profitably in the education of dealers and the intensive cultivation of sales in a restricted territory. This could be done without additional expense by using the best equipped travelers on the payroll as dealer instructors.

While the importance of dealer education will be admitted by all sales managers it requires courage to undertake it on a large scale. Up to this time there has been a great deal of tradition in the sale of automotive prod-

ucts. There is a traditional way of doing things and there is a way which may be more or less revolutionary. It is much easier to proceed along traditional lines and when a general manager demands an explanation it is much easier to make if the course followed is based on precedent. But—and this is the important point—adherence to tradition may mean failure while the charting of a new course may mean discovery of the promised land of success.

THERE is one tradition in the industry which should be thrown overboard once and for all. That is the method by which some factories still determine dealer quotas. Under this system the production man usually determines how many cars he can turn out in a year and then the sales manager divides this output among the dealers on his staff. Too often this is done by arbitrary rule of thumb methods. No especial attempt is made to determine the relative sales possibilities in each dealer's territory.

Adherence to such a method is unfair to the dealer and costly to the factory. The volume of a dealer's sales depends largely upon general business conditions in his territory. These conditions never are uniform throughout the country. It should be part of the job of the factory sales manager to know exactly what are the most promising fields for cultivation and those which are least promising.

If he has this knowledge he can apportion the factory output much more logically. Fixing quotas on a population basis or on the number of cars in the same price class sold the previous year means too literal acceptance of the adage that history repeats itself. It usually does—but not annually.

What happened last year, in a business way, is a mighty poor barometer of what's going to happen this year. The successful sales manager of the future must know what current business conditions are in every nook and corner of the United States and he must be able to make a shrewd guess at what they are going to be six months ahead. He must know the good counties and the bad counties in every State and he must know why they are good or bad.

In fixing quotas for agricultural sections, for example, it isn't enough to know that the aggregate value of the crops of the country last year was more than $1,500,000,000 more than for the preceding year. Nature didn't spread her largess impartially. The cotton belt as a whole is prosperous, but each part isn't equally prosperous. There are good, bad and indifferent sections in a State like Georgia. There are many ways for a sales manager to gather this essential data but he must get them somehow if he is to make his quotas scientifically.

Sales analysis will be a pre-requisite of success for the factory, but it is equally important to the dealer. The man who sells a certain make of car in an agricultural county may believe firmly that he knows by his first name every man in the territory who can afford to buy a car in that price class, but he doesn't. If he will take a piece of paper and a pencil and write down the names of every man he knows he will quickly find how far he comes from the mark.

EVERY sales manager recognizes the need for more effective and more extensive dealer education. Men and money are necessary to put the job over properly. Perhaps they will have to be obtained at the expense of some other factory sales activity. The "how" of dealer education is far from being thoroughly understood.

This article gives some practical hints for immediate application. It tells what is being done by certain manufacturers and offers suggestions for immediate use.

He needs this information, however, if he is to make the most of his opportunities. There may be a county directory which will give him a list of names and occupations. If there isn't he can get the tax lists which will make a good starting point. Once he has the names he must run them through the hopper, time after time, to weed them out. He must know who owns cars now and the condition of those cars. A lot of them must be ready for the junk heap with the owners thinking of replacements. He may be able to sell them his line and all these chaps will make live prospects.

A tax list is a big help but it doesn't go far enough. If the dealer can get some line on how much taxes each individual pays he will be fortunate. He may be able to check a good many of the names with his banker if he agrees to hold the information confidential. There are a lot of sources from which to obtain bits of information of this character which will be exceedingly helpful.

When the names have been checked and rechecked and put through the hopper for the last time, the residue will provide a prospect list worth its weight in gold. With it in his possession the dealer will know he isn't wasting a lot of his ammunition on people who may be putting up a front, but who haven't the resources to buy. No diagram is required to demonstrate what a dealer can do when he knows the names of the people in his territory who can afford to own a car of the class he sells.

The dealer will be able to do this work on his own hook, but he is likely to do it a good deal more effectively and enthusiastically if his factory is back of him, giving him valuable suggestions, helping him and applauding him when he succeeds.

Getting a live prospect list is a fundamental of retail motor car merchandising. There are many good methods. It would be possible for a factory to supply its dealers with the salient points of several of them if it did not want to recommend one and let each dealer work one out for himself from the data given him.

The factory can give the dealer invaluable help in teaching him the most successful selling methods. It can teach how to teach his salesmen. In fact, more than one successful factory is specializing on the education of retail salesmen. This can be done through literature or by travelers who can deliver constructive illustrated lectures which will put "pep" into the men on whom the dealer depends for his success.

Then there is the problem of used cars, the ever present, ever pressing question which is so close to the heart and pocketbook of every dealer. He needs education which will help him merchandise used cars more than he does to help him sell new ones. Some factories have about decided to spend substantial amounts in cooperating with its sales organizations to slay this dragon.

One company has engaged two or three used car experts who are on the road all the time. They are trouble shooters who go into the establishments of dealers heavily loaded with used cars and show them how to get rid of the burden. They don't merely drop in and then right out again, but they stay a week or two weeks, if necessary, and put over the job.

Another company encourages its dealers to come to it

with their financial difficulties. If the questions asked can be answered by mail the needed help is given in that way, but if they are really serious the comptroller and sales manager pack their bags and go out to see the afflicted dealer. They study his problem and tell him some practical solution.

Still another company encourages every dealer to send in to headquarters every week any effective plan he has worked out to increase the sales of new cars. Some dealer may have made a successful drive to sell preachers or bankers or doctors. The actual sales experiences, which will apply equally well in almost any town, are put into a snappy bulletin which goes out regularly every week to every dealer. This plan has been found very helpful.

Merchandising is the big job of the industry for this year and for years to come. For that reason factory executives must study it more carefully than they ever have before and put into effect practical plans which they can afford to carry through for the education of their dealers and the solution of dealer problems.

As we said in the beginning dealer education is an important part of factory merchandising.

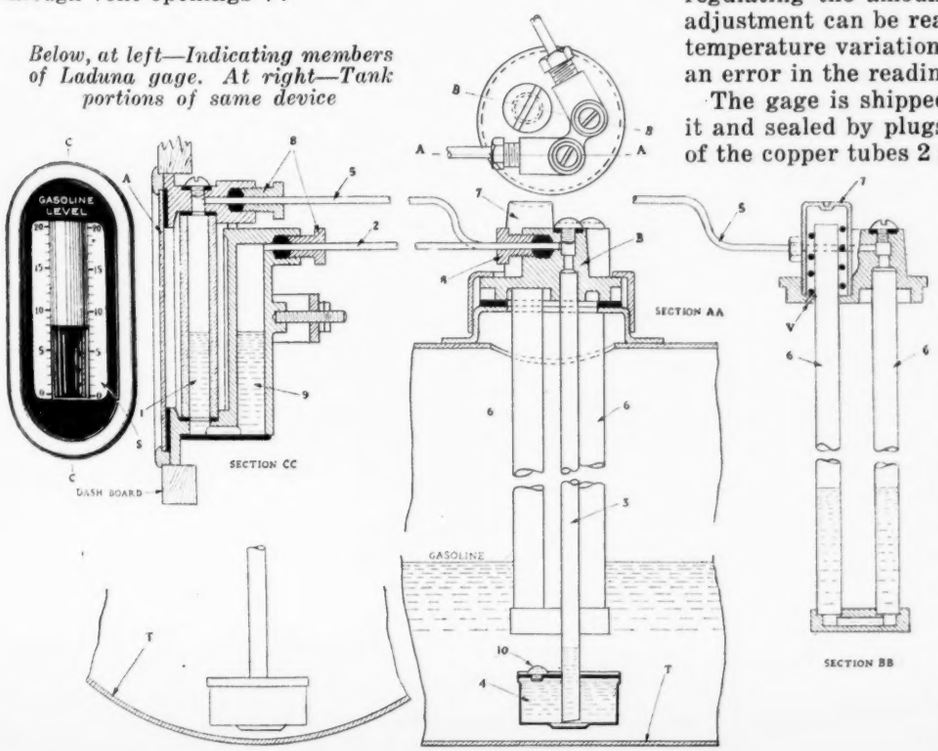
New Dashboard Type of Gasoline Gage

A DASHBOARD type of gasoline gage operating on the hydrostatic principle has been developed by the Sokoma Co., and recently placed in production. This gage, known as the Laduna, has the advantages that the indicating portion is mounted on the dash in plain sight of the driver and indicates the amount of the fuel in the tank in gallons; that there are no moving mechanical parts; that its indications are not affected by grades, vibrations and temperature changes, and that it may be used with any form of fuel feed.

The gage proper, *A*, is in the form of a U tube containing a red-colored light oil. The front glass tube 1 is partly surrounded by a celluloid scale *S* graduated in gallons, the scale being made to correspond to the shape and capacity of the particular tank. The rear tube 9 is connected through copper tube 2 containing air with the pressure receiving tube 3 forming part of a tank receiver *B*. The end of this tube is inserted in a cup 4 containing glycerine, a liquid insoluble in gasoline.

The top end of tube 1 is connected through copper tube 5 with a second U tube 6, referred to as a balancing tube, in the tank, this tube being partly filled with glycerine. The other leg of this balancing tube opens inside cap 7, which communicates with the top of the tank through vent openings *V*.

Below, at left—Indicating members of Laduna gage. At right—Tank portions of same device



In operation, the weight of the gasoline in the tank raises the glycerine columns in tubes 3 and 6 and the oil column in gage *A*. The size of these tubes is varied so as to permit of using the same size of gage and the same length of scale for all depths and capacities of tank, the divisions of the scale being made smaller for large tanks, and vice versa.

By reference to the diagram of the system it will be seen that there are two separate air columns, in tubes 2 and 5, on opposite sides of the oil column in gage *A*, the air in these tubes being permanently entrapped between the oil on the one side and the glycerine columns on the other. The question might be raised as to what happens when the air in tubes 2 and 5 is expanded by an increase in temperature. As a matter of fact, the columns in tubes 3 and 6 cannot be prevented from moving when the air expands or contracts, but it is possible to so proportion the tubes and the air volumes that for any change in temperature and the consequent increase or decrease in the height of the column in tube 3, there is an exactly equal change in the difference in heights of the columns in tube 6, so there will be no cause for the oil in the gage to move one way or the other. In practice it is said to be easy to make the final temperature adjustment by regulating the amount of glycerine in tube 6, and this adjustment can be readily made sufficiently close so that temperature variations of 30 or 40 deg. will not produce an error in the readings exceeding ¼ gal.

The gage is shipped with the proper amount of oil in it and sealed by plugs forced into the glands 8 in place of the copper tubes 2 and 5. The receiver tubes are also filled with liquids and sealed in a similar manner, the open tube being closed by a washer under cap 7 and cup 4 by a screw 10.

If the copper tubes 2 and 3 are broken or damaged, they may be repaired or replaced by an ordinary mechanic, but the gage must then be reset, that is, the connections made only after the proper amount of gasoline has been put into the tank, the amount indicated by the gage when the connection was broken.

A similar gage has been developed for indicating the oil level in the engine crankcase. This instrument is made smaller than the fuel gage and graduated to indicate the relative oil level from "zero" to "full." A special type of duplex gage has been developed for Fords.

New Faun Good Example of Modern German Light Car Design

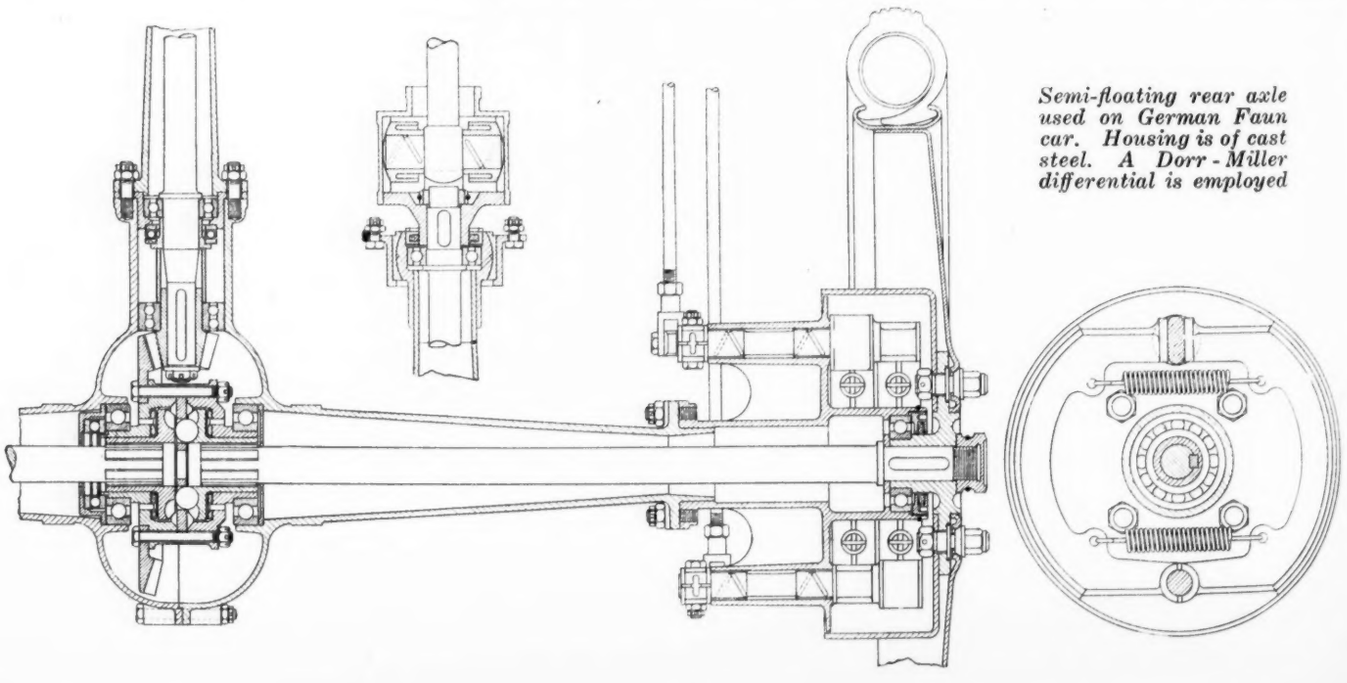
Four-cylinder engine with piston displacement of 86.5 cu. in. is used. Detachable aluminum cylinder head. No spark and throttle levers used in steering gear. Overhead camshaft.

THE Faun (Fahrzeugfabrik Ansbach und Nurnberg) Works in Nuremberg are one of the largest motor truck manufacturers of Germany. Two years ago they decided to enter the passenger car field with a small car of economical upkeep. Numerous changes have been made in the original design, the latest model incorporating many features of interest as exemplifying German light car practice. The new Faun carries a four-cylinder engine with overhead camshaft and is cast in a block and combined with the transmission into a unit power plant.

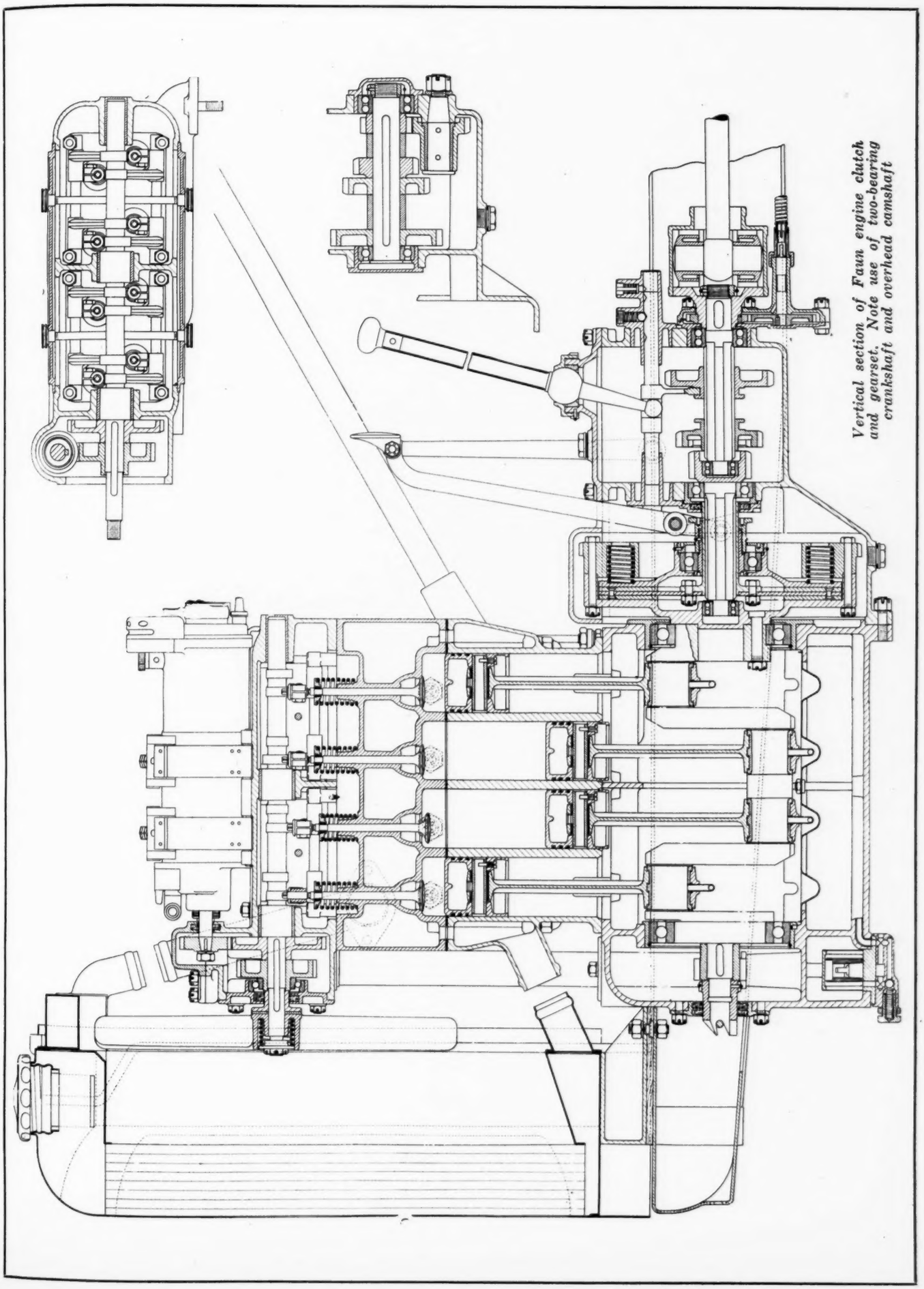
The engine has a bore of 64 mm. and a stroke of 110 mm. (2.5 x 4.33 in.), and with a piston displacement of 86.5 cu. in. develops 24 hp. at 1800 r.p.m. The crankshaft is forged in one piece and runs in two large ball bearings. The crankcase is of barrel type and the crankshaft with its ball bearings may be withdrawn from the rear after removing the nuts from the studs holding the transmission case to the crankcase and loosening the connecting rods from the crank. The big ends have babbitted bronze shell bearings, while the small ends are provided with bronze bushings, the hollow piston pins being fixed in the piston.

The pistons are of cast iron, with three narrow rings of the usual type and a sharp-edged scraper groove on the lower part of the skirt. The piston head is stiffened by a rib in the plane of connecting rod motion. Because of the use of a two-bearing crankshaft it has been possible to keep down the center distance between adjacent cylinders to 74 mm. (2.91 in.), which is very small for a bore of 2½ in. Of course, there is no jacket space between cylinders. Ample water jackets surround the cylinders at the sides, the depth of the jacket space increasing toward the head. Each cylinder has a cast recess on one side to permit free movement of the rod.

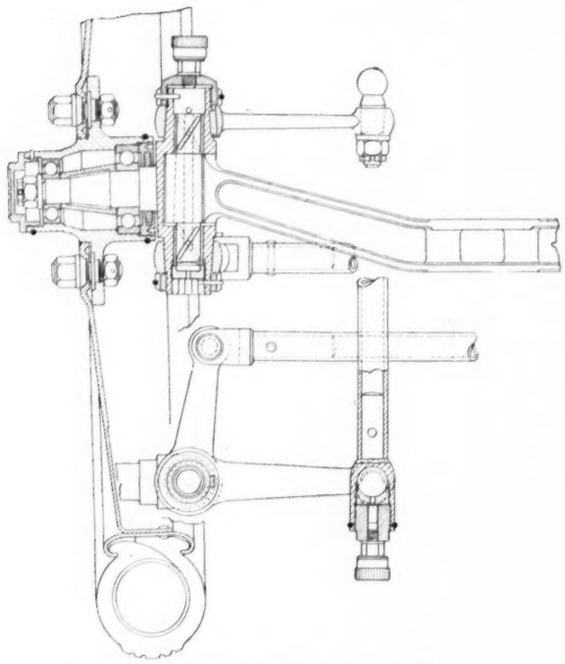
At the bottom of the barrel type crankcase near the front is located the gear type oil pump which is driven from the crankshaft by a vertical shaft and helical gear. The pump with drive shaft may be withdrawn from below, after removing the small cover plate. Oil scoops on the connecting rod heads, in conjunction with troughs underneath them, furnish splash lubrication for the rotating masses. The valve operating mechanism on top of the detachable cylinder head is lubricated by pump through an oil lead, part of which is cast in the crankcase and the rest of which consists of an exposed oil tube. There is a similar lead for returning the superfluous oil to the sump in the crankcase.



Semi-floating rear axle used on German Faun car. Housing is of cast steel. A Dorr - Miller differential is employed



Vertical section of Faun engine clutch and gearset. Note use of two-bearing crankshaft and overhead camshaft



Front axle and knuckle used on Faun car

On the left side the crankcase has a large opening with cover to give accessibility to the big ends, etc. This cover is cast with ribs on the outside so as to better radiate the heat and keep down the temperature of the oil.

The valves in the detachable aluminum cylinder head are operated by an overhead camshaft, driven by vertical shaft and helical gears. The camshaft runs in three large bronze bushings and may be withdrawn from the front end. It actuates each valve separately through a rocker arm with adjusting screw. Both manifolds are cast integral with the cylinder head.

The carbureter is a Solex, and ignition is effected by the Luma combined ignition and lighting generator, mounted on top of the detachable head and driven from the camshaft through spur gears. As may be seen from the drawings, the generator consists of two machines in a common case, one an ignition magneto and the other a lighting dynamo. The shafts of the two machines are coupled together by a simple clutch. The drive is located at the commutator end of the generator and the two shafts are mounted in three ball bearings. The magnets of the ignition machine are arranged in an annular casing so that the machine may be rocked around its longitudinal axis to maintain uniform spark intensity when advancing and retarding the point of ignition. This generator is geared to run at crankshaft speed because such small car engines are compelled to operate at high speeds of revolutions. The starting motor drives to the toothed flywheel and the battery is arranged beneath the frame.

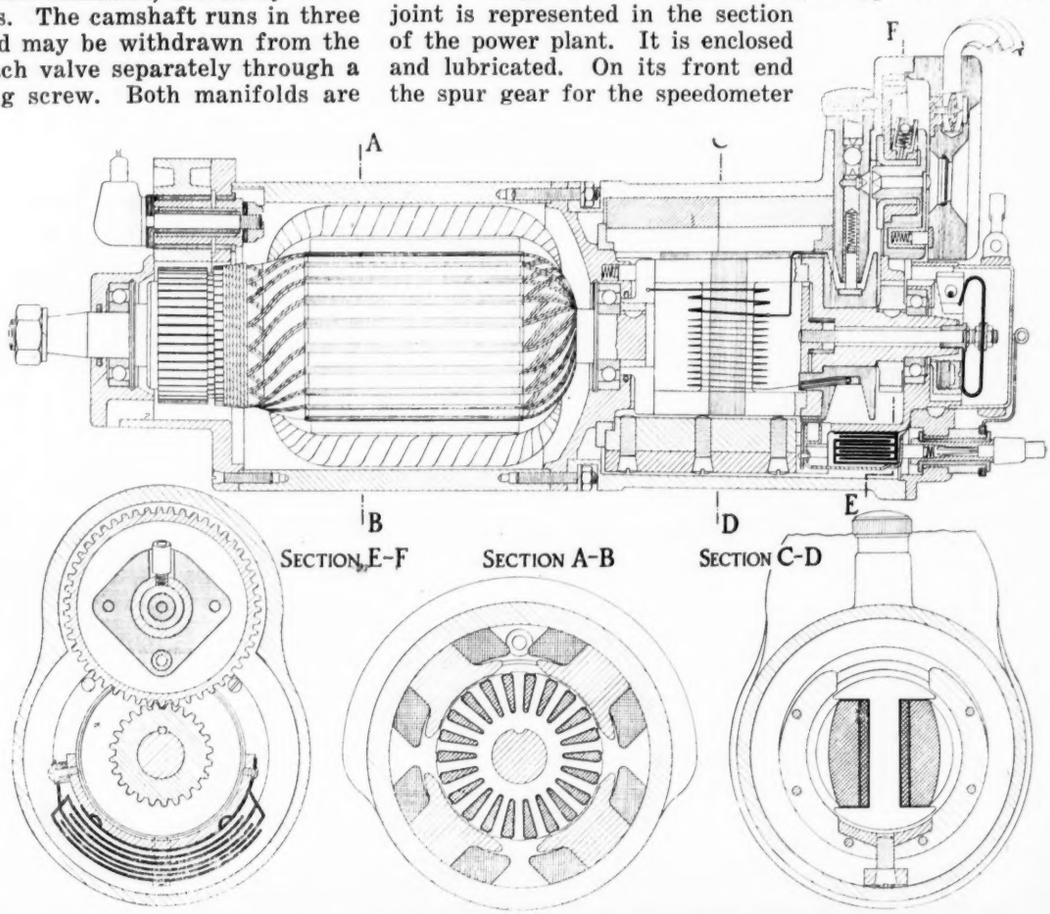
Cooling of the engine is by the thermosyphon system. The V-type cellular radiator is made of brass and its top tank has a small rearward extension to give additional water capacity. The two-bladed fan is cast of aluminum and is mounted on the forward end of the camshaft. In the hub of the fan a spring clutch is provided, permitting a certain amount of slippage.

Clutch and Gearset

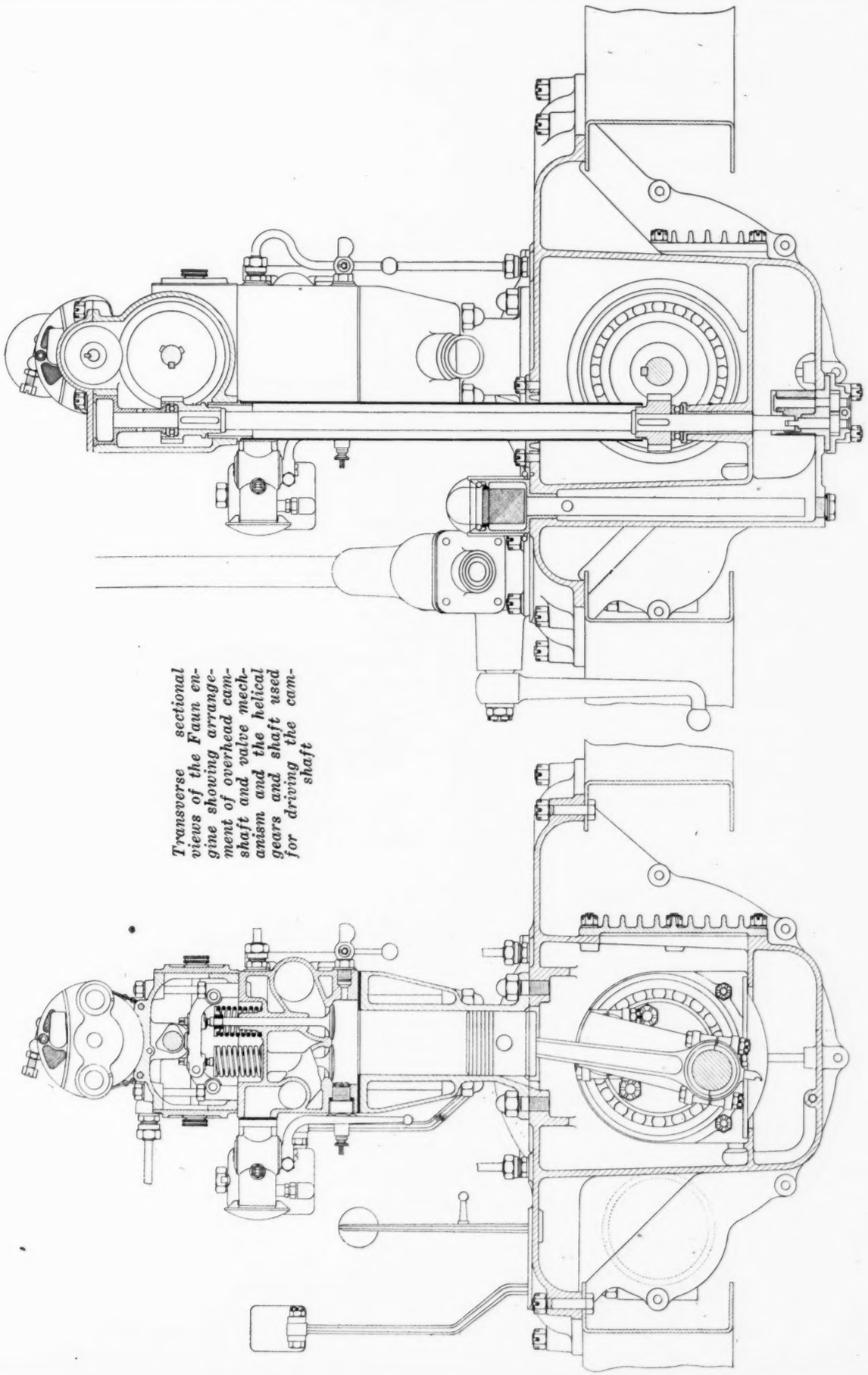
The design of clutch is shown by the sectional view of the power plant. It is a dry plate clutch lined with fibre and engaged by eight helical springs arranged in a circle. The flywheel rim is in two parts, one forming a housing for the clutch springs, which latter can be adjusted from outside.

The clutch and transmission housing is bolted to the crankcase of the engine. The transmission is a three-speed device and its gearshift lever is mounted in the center line of car and operates the gears with ball and socket. All transmission shafts run in ball bearings. On the right-hand side of the engine block there protrudes a short transverse shaft which carries the clutch pedal, the brake pedal and the accelerator pedal. On the engine-transmission block there is also mounted the steering gear. Thus when the car is to be taken apart or put together there are only two units to handle, the power plant and the rear axle.

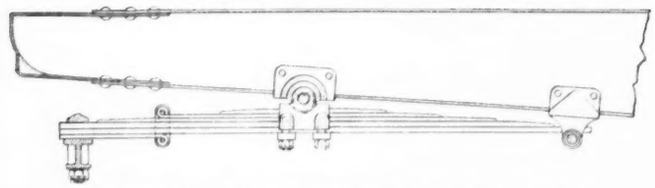
The design of the single cross-pin type of universal joint is represented in the section of the power plant. It is enclosed and lubricated. On its front end the spur gear for the speedometer



Luma combined magneto and lighting generator as applied to the Faun car. This unit is driven off the camshaft by spur gears



Transverse sectional views of the Faun engine showing arrangement of overhead camshaft and valve mechanism and the helical gears and shaft used for driving the camshaft



Cantilever type of front spring used on Faun car

drive is arranged. The propeller tube takes up the rear axle thrust as well as the torque. The axle is semi-floating and has a housing of electric cast steel. The differential case is divided vertically in the center. This construction has been chosen because otherwise the casting would have been too complicated and too difficult to machine. All rear axle bearings are ball bearings, as is usual in German cars. The final drive is by bevel gears. A "Dorr-Miller" type differential is used.

Both brakes are expanding brakes with toggle spreaders and are arranged side by side in rear wheel drums. A balance lever equalizer is provided for each brake. Adjustment may be effected at the forward ends of the brake rods.

The Mercedes type of front axle is used and is forged of nickel steel. All wheels are detachable steel disk wheels and are interchangeable front and rear. The tire dimensions are 760 x 90 mm. (30 x 3½ in.).

The design of the steering gear is very simple, as no spark and throttle levers are used. The steering gear comprises a complete wheel of bronze in mesh with a steel worm.

The front springs are 28 in. long and of cantilever design; for transmitting the thrust from the frame to the front axle the leaf next to the shortest is formed with an eye and a short leaf underneath the main leaf and also provided with an eye extends back from the front axle for some distance and connects with the previously mentioned leaf by a shackle, the bolts of which have grease boxes. The rear springs are the usual cantilever type, 40 in. long, 2 in. wide and having eight leaves.

The frame is a new design with side members of very deep section at the middle. The front cross member has a wide upper flange, serving as support and a sort of an apron for the engine. The center and rear cross member have the usual U-section.

The car has a wheelbase of 110 in., a tread of 47½ in. and a road clearance of 10 in. It seats four people and is claimed to develop speeds up to 46 m.p.h. The normal fuel consumption is said to be approximately 1 gal. per 30 miles.

Ace Chassis Designed Especially for Bus Service

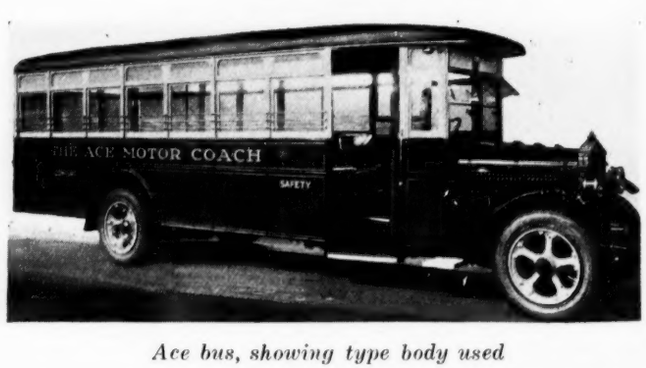
AN Ace motor bus, known as model "C," has recently been placed on the market by the American Motor Truck Co., Newark, Ohio. This new 30-passenger bus is powered with a Midwest, model 400, engine which has a bore and stroke of 4½ in. by 6 in.

The clutch is a Brown-Lipe model 55, and transmission is a four speed, selective type of the same manufacture. Hotchkiss drive is used and tubular propeller shafts with four universal joints.

Timken front axle is used with a 68 in. tread, while the rear axle is a Timken, No. 6511-A, underslung worm drive with 74 in. tread.

Three separate brake units are employed. The service brake and emergency hand lever brake are both of the internal expanding type on the rear wheel brake drums. The third brake is a dual external contracting type on the propeller shaft.

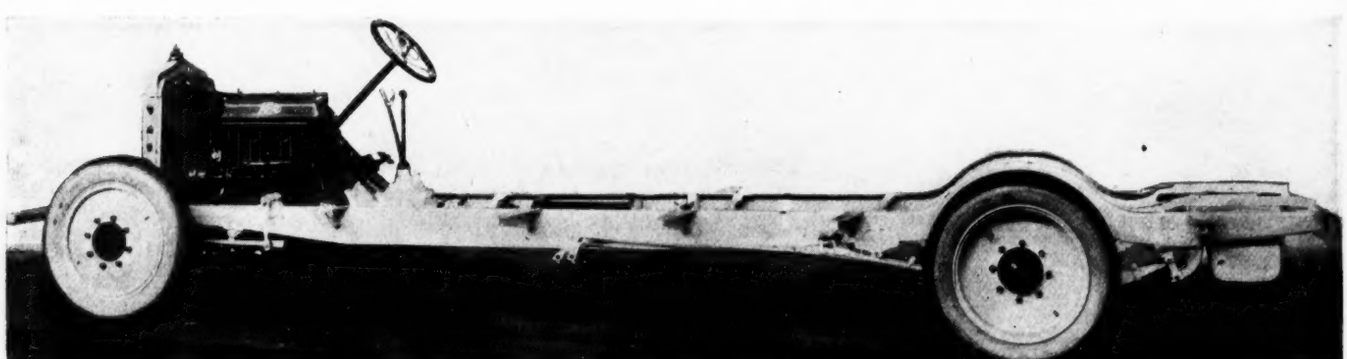
Front springs are semi-elliptic 40 in. long by 3 in. wide. Rear springs are semi-elliptic, 60 in. long and 3½ in. wide. Both front and rear springs are of the progressive type.



Ace bus, showing type body used

The frame is of passenger car type but oversize. Pressed steel channel section with a maximum depth of 8½ in. and thickness of 3-16 in. is used. Steering gear is a screw and nut type Ross.

Dayton hollow spoke cast steel wheels are employed. These mount 36 by 6 in. pneumatic all around with dual pneumatics on the rear. The wheel base is 204 in.



Ace bus chassis has frame with kickup over rear axle and outriggers for body support. Three sets of brakes are employed

British Encourage Development of Non-Glare Headlamps

"Moonbeam" lamp with ellipsoidal reflector, narrow opaque shield in focal plane and lens with vertical corrugations on its rearward surface wins R.A.C. medal in field of eight competitors. Visibility of standard disk placed at side of car used as measure of glare.

By M. W. Bourdon

TO encourage endeavors to solve the non-glaring headlamp problem the Royal Automobile Club of Great Britain conducted during 1922 a series of tests of specially designed headlamps and anti-dazzle attachments for existing lamps, when these have been submitted for trial by interested parties. Eight lamps and attachments have been tested, and as a result the R.A.C. has awarded a gold medal for the most meritorious lamp to one called the Moonbeam, made by the Moonbeam Engineering Co., Ltd. The special features of this design and the results as shown by the standardized tests are of interest. First it may be explained how the various lamps and devices are tested.

The idea behind this test is that the purpose of a motor-car lamp is to illuminate an object upon the road, the presence of which it is essential for the driver to be aware of for reasons of safety. How well or how badly such an object is illuminated, is a true test of the usefulness of a lamp and it is clear that, if an object seen only with difficulty is illuminated properly by a lamp, all other objects will be illuminated at least as well. In order that all lamps tested should be comparable, the object used has been standardized, the standard being artificially represented by a number of grey irregular shapes, superimposed on the dead-black background of a disk 18 in. in diameter. As it is impossible to standardize colors, the grey tone is achieved in practice by alternate stripes of black and white.

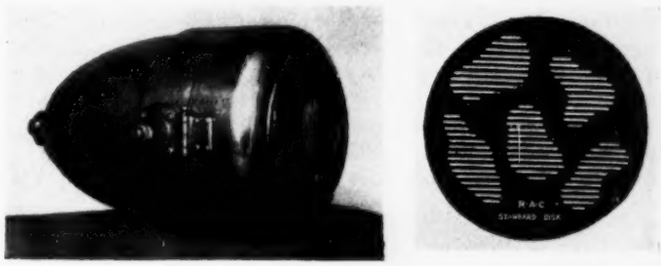
The visibility of this disk, reproduced on a small scale herewith, corresponds approximately to an object exemplified by a pedestrian who is so dressed that his color offers little contrast to that of the road surface. The distance from the car bearing the lamps under test at which the disk placed at various heights and positions beside the car can be seen, is the measure of the range of the lamp. The dazzling effect of the lamps is measured by determining the extent to which that dazzling effect prevents an observer aproaching the lamps from seeing the disk when it is placed immediately to the side of the lamps.

Construction of Moonbeam Lamp

The Moonbeam lamp has a body which in general follows usual practice. The essential parts of the lamp are: a metal reflector, a transverse vertical opaque screen or diaphragm of narrow section, and a projecting lens mounted in the front aperture of the lamp. The electric bulb is placed at one focus of the reflector, the back part of which is ellipsoidal, and the greater part of the light is reflected from this portion of the reflector to the second focus of the lamp, which is just above the horizontal cross-bar forming the diaphragm. The light then passes through a lens which is intended to make parallel the rays which emerge from the lamp. The cross diaphragm is arranged in the focal plane of the lens in order to produce in front of the lamp an inverted image of itself. The back of the lens is formed of a number of shallow vertical corrugations intended to spread the beam laterally, while in the center of the outer convex surface of the lens is ground a hemispherical depression 1-3/16 in. in diameter and ½ in. deep. The surface of this depression is frosted.

Means for Adjustment

It is necessary that the bulbs of these lamps be adjusted so that the filament is horizontal and at the focus of the reflector. To attain this end three means of adjustment are provided for the bulb, viz., fore and aft, rotational and vertical, the latter by means of an eccentric fitting in the lamp for the bulb holder.



Left—External view of the Moonbeam headlamp which won R. A. C. medal as best of eight non-glaring lamps submitted for test during 1922
Right—Reproduction of standard 18-in. disk used for visibility and glare tests

The beam produced has a considerable lateral spread with a sharply defined region of comparative darkness above it, the plane of separation or cut-off between the light and dark regions being horizontal and at about the level of the lamp—approximately 42 in. from the ground.

A summary of the R.A.C. report concerning this lamp and also corresponding particulars relating to an ordinary electric headlamp provided by a well known British maker is given in the table which appears on the following page. In each case two lamps were used.

TABLE OF COMPARATIVE HEADLAMP TEST DATA

Lamp	Range at Different Heights, ft.			Side Illumination Range at 15 Ft. from Center of Beam at Heights ft.		*Dazzle
	3½	4½	6	3½	6	...
Moonbeam .	344	125	90	182	44	150
Standard ..	266	266	270	207	243	14

*The figures in this column represent the distance from the lamps to which an oncomer (with an eye level of 4½ ft.) has to approach before the special attributes of the lamp permit him to see the standard disc (representative of a pedestrian) situated between the side of the car and the curb.

To assist in interpreting these results the following examples may be quoted: (a) A driver using Moonbeam lamps would be able to distinguish the legs of an approaching pedestrian dressed in grey when 344 ft. distant (266 ft. with standard lamp) and the full height of the man when 90 ft. away (270 standard). (b) A driver would see the legs of a pedestrian stepping off the sidewalk 15 ft. to one side of the center of the lamp beam while 182 ft. distant (207 standard) and would see the full height of the man 44 ft. away (243 standard). (c) A pedestrian or oncoming driver with eye level above 4½ ft. from ground would cease to be dazzled when he had approached the lamp to within 150 ft. (14 standard) and would then and thereafter be able to distinguish any object between these lamps and the sidewalk.

It will be realized, therefore, that the Moonbeam lamps have a longer range at 3½ ft. from the ground than the standard despite the lower candle power of its pair of bulbs, viz., 38.2 as against 51.5, but only a third of the range at 6 ft.; side illumination is similarly reduced at a height of 6 ft. But both these results are only to be expected and cannot be altered when the dazzling light is cut off at a height of 3½ ft. so far away as 150 ft. from the car.

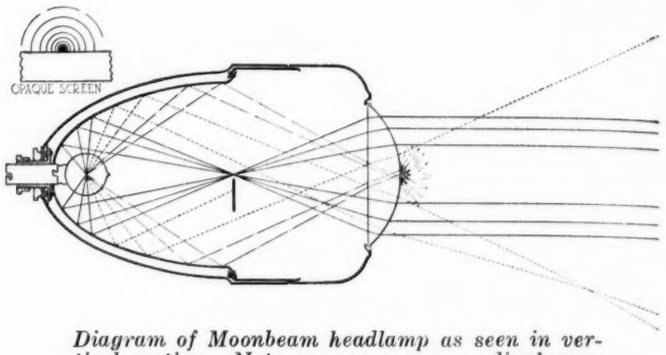


Diagram of Moonbeam headlamp as seen in vertical section. Note opaque screen or diaphragm in focal plane of lens and direction of light rays

The R.A.C. is continuing this series of tests during 1923 and again offers a gold medal for the best results shown during the year.

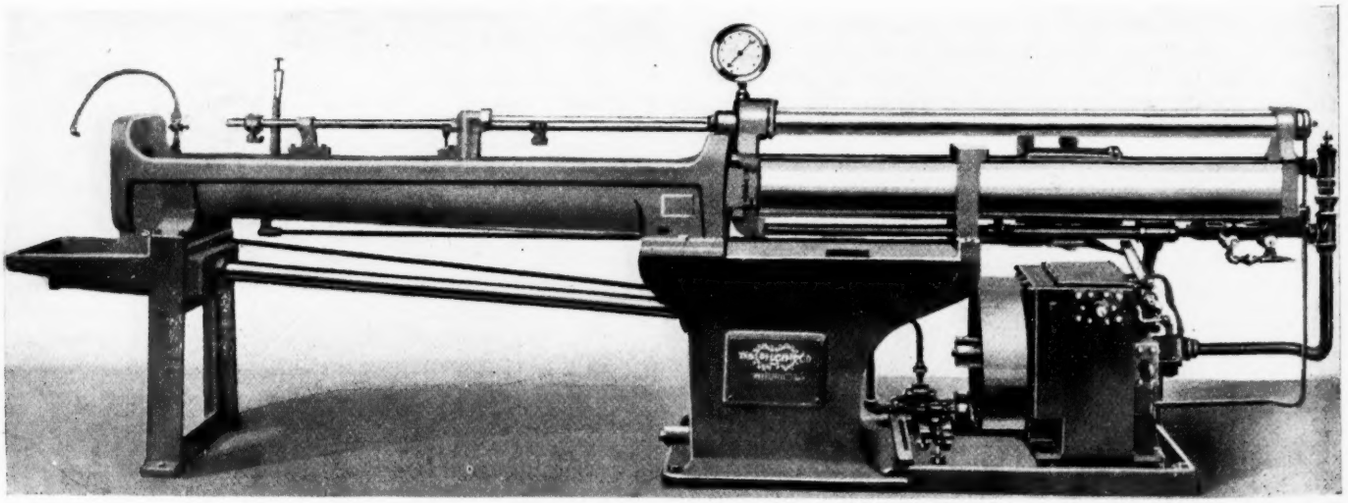
New Hydraulically Operated Broaching Machine

A BROACHING machine operated hydraulically has been developed by the Oilgear Co. and is illustrated herewith. The advantage of this machine is said to lie in the fact that it has a wide range of operating speeds, being capable of making from 48 to 250 cutting strokes per minute. The highest cutting speed available is 30 ft. per minute, and there is a practically unlimited choice of speeds. Savings on labor and power cost are also claimed.

A variable delivery pump delivers a steady flow of oil to a double-acting cylinder whose piston rod is connected to a sliding head which operates on ways in a U-shaped trough. The rate of oil delivery to the cylinder depends on the length of the pump stroke, which latter can be varied from zero to the maximum. As the speed of piston travel depends on the rate at which oil is pumped into the cylinder, this speed can be changed at will. The speed of the return stroke is adjustable independently of the cutting stroke. Automatic stops are provided which can be set for any desired length of stroke.

Quick-acting relief valves prevent the pulling apart and the buckling of a broach. These valves, one of which is placed on the cutting end and one on the return end, automatically relieve the pressure and stop the machine whenever the pressure builds up to a predetermined point. In case a broach is caught during the cutting stroke, the relief valve, set for a pressure slightly greater than is necessary for the normal pull, will act before the broach or the machine can be damaged. Likewise, any excessive load on the return stroke will cause the relief valve on that end to act and quickly stop the machine.

Oilgear broaching machines are driven by vertical belts from line shafts or motors. When a motor is used, it may be mounted above the main cylinder on an adjustable support.



Hydraulic broaching machine developed by the Oilgear Co.

Paige Develops Practical Sales Analysis Plan

Enlarged state maps showing sales territories give constant close-up picture of points to which cars are going as well as those in which sales are not up to mark. Provides check on dealers.

STARTING a year ago with a collection of enlarged State maps, comprising roughly the sales territories in the United States, and an executive who had gained some slight experience in distribution and sale of automobiles in other companies, Paige-Detroit Motor Car Co. is working out a system of distribution which gives them a constant close-up picture of the disposition of its entire product and the general efficiency of its sales organization in covering the territories.

Through the distribution department the company spreads the whole country in a complete panorama before it and can trace immediately the points to which its cars are going and the parts that are neglected. Further, it can tell immediately whether production at the factory is running in greater volume than sales and can maintain a balance either by intensified efforts at one end or, where conditions warrant, a check at the other.

Though this is the most important function of the department, a secondary function and hardly less important is that it gives the company something definite on which to base the distribution of its product from year to year and permits of accurate diversion where unexpected conditions arise at varying points. Furthermore, a complete record of every sale is kept, giving the factory a file of all owners of Paige-Jewett cars in the United States, their occupations and other information designed to help the factory in its sales promotion and advertising effort.

There are various elements which combine to make the plan successful, the most important of which is the complete cooperation of the dealer and distributor organization in the prompt return of certificates of sale. These certificates accompany each shipment of cars from the factory, each certificate being charged to the distributor at $10 for which he receives credit as the cars are sold and the certificates duly filled in return.

When received at the factory the sale is pegged on the map with a pin representing the car sold, different colored pins being used for Paige and Jewett. The pin goes in the exact spot the sale is made, the map being large enough to indicate practically every hamlet in the country. Pins with numerals on them are used as sales mount. Thus if all the business in any territory is going into a particular section, the fact may be called to the attention of the distributor, and if the territory proves too large for the sales organization already there, additional dealers may be appointed or the dealer may have opportunity to add more salesmen.

Each distributing territory is outlined on the map as well as the location of each dealership operating therein. It has been found in certain instances that most of the business being done by a dealer is in the territory immediately adjacent to his place of business, while a large part of the territory is not showing results. Reports obtained by the factory from listing companies tell whether other manufacturers are getting more general business in this district than Paige and if they are attention of the distributor is called to this fact that he may arrange to help dealers get their proper share.

Outlining distribution at the beginning of a year, the company considers how many cars were placed into each of the territories in the preceding year and bases the new distribution on this in connection with general conditions outlined and to be expected. Where there is nothing abnormal in conditions an average increase in business is provided for. Where there has been an undersold market due to local conditions, industrial or otherwise, and these conditions have been removed, a pronounced improvement is looked for. Where conditions and outlook are unfavorable, the company provides against an accumulation of cars in this district until the unfavorable conditions are removed.

Throughout the system is the thought to make conditions better for the distributor and dealer, and at the same time to protect the factory against a tapering off in business which may be unwarranted by the general sales possibilities in any section. Under the system each territory gets a fair share of all of the factory production. This in turn must be distributed equitably throughout the district or the factory knows that its interests are not being fully served. No dealer can complain of not getting his fair share of cars because every district is plotted out to take a fair number. If it does not get them the factory knows this immediately and may take steps to furnish them.

Contact Kept with Owners

By keeping a record of all owners the factory knows the class of purchasers to whom the cars are going and where there is a lack of representation among groups which it thinks should be buying, it is enabled to direct special sales promotion and advertising effort in their direction.

The list of owners gives the factory opportunity to keep in personal touch with them and to keep them informed on developments which will help them to get the best possible results from their cars. Where there are to be changes of importance in the line, the factory will advance information to the owners so that they may take advantage of that early knowledge.

It is the design of the Paige company to make this department as complete in its sphere as human thought and ingenuity can make it. As a source of definite information it is considered potentially invaluable. Further developments of it will find separate maps of all large cities showing the distribution of their product.

Application of Soaring Machine Practice to Airplane Design

Detailed study of gliders in recent trials indicates that builders of propelled aircraft may adapt some construction ideas. Light sport plane likely development. Engine would carry plane to height at which soaring would be possible.

By Benno R. Dierfeld

IN trying to explain how it is possible to fly without an engine, a distinction must be made between gliders and soaring machines. The glider is intended merely to glide from an elevated starting point with as low a rate of drop as possible, whereas the soaring machine may rise to altitudes hundreds of feet above its starting point, then, at the will of the pilot, perform various evolutions and finally glide down to earth. In practice, however, both types of machines are inseparably combined, as any successful soaring machine must above all have a favorable (that is, a small) gliding angle. As the name suggests, soaring machines make use of the energy of wind currents for sustentation and propulsion.

Besides the horizontal air currents, the direction and strength of which vary widely at different altitudes, there are air currents directed vertically upward and downward. These are due to the heterogeneous conformation of the earth's surface and the unequal reflection of the sun's rays. In flying across an isolated building, the pilot of an airplane often feels a sudden upward thrust, followed by a rapid drop of the plane, even at altitudes of several hundred yards. The wind actually "jumps over" the building and this wave-like motion is transmitted to the higher strata of the atmosphere. Every one has observed that a piece of paper thrown out of the window at the side of the house toward the wind, has imparted to it a rapid whirling upward motion. The same phenomenon may be observed to a still stronger degree in the mountains, the hillsides having the same effect as the walls of the house. Reflection of the sun's rays, especially by sandy and rocky surfaces, is favorable, and produces vertical air currents. The "holes in the air" or "air pockets" are nothing else than such vertical air currents which sometimes extend to altitudes of several thousand yards and often are of such strength that when impinging upon the wings of an airplane they produce a loud clapping noise. Many a break of a wing spar, followed by a crash to earth, could be traced back to this cause. For this reason airplane pilots avoid the mountains if possible. However, the pilot of a soaring machine is dependent upon such vertical air currents as the operation of his machine is based upon their effects.

When a soaring machine is pushed along or dragged from the top of the mountain against the wind, the gliding angle of the machine on the one hand and the direction of the rising air current on the other determine its actual direction of flight. In the case of successful German soaring machines a rising air current of 2.6 to 3.3 ft. per sec. (measured vertically) suffices to permit of a horizontal flight. Stronger upward currents render it possible for the machines to attain altitudes higher than the starting point. Of course, on the opposite side of the mountain, away from the wind, the air currents are downward. Even a large motor-propelled airplane is carried down into the "pocket" thus formed.

To successfully fly a soaring machine one must have exact knowledge of the local air currents, which usually vary widely with the seasons, the time of day, the weather and the direction of the wind. Favorable rising air currents are found only at certain points in the mountains. A very favorable place is the Wasserkuppe in the Rhoen Mountains, where the glider contests were held last summer, the crest being 3000 ft. about sea level and 1475 ft. above the surrounding country, with practically no trees or brush on the slopes. The surrounding fields are rather soggy meadows, forming a soft carpet for landing. Whatever the direction of the wind, there is always the possibility of starting, at least for gliders of small and medium size. Soaring machines of larger size can start when the wind is from the west, northwest, north and northeast, making use of steep slopes. The best performances of the current year were accomplished in west winds, because on the west side there are no hills or other obstructions. Since 1920 there have been three contests at this point, and the results achieved in these contests are tabulated below:

Contest	1920	1921	1922
Number of competitors	25	45	53
Number of creditable flights	39	132	190
Flights of ½ min. duration	2	21	67
Flights of 2-4 min. duration	1	5	17
Flights of 4-6 min. duration	..	3	7
Flights of 6-15 min. duration	..	..	7
Flights of ¼-½ hr. duration	..	..	5
Flights of 1/3 hr. duration	..	..	4
Flights of ½ km. distance	1	7	16
Flights of 2-4 km. distance	..	3	5
Flights of 4-10 km. distance	..	..	10
No. of machines carrying off prizes	13	21	25
Best Performances			
Distance in miles	1.14	4.66	6.22
Duration in mins	2.37	21.62	190.00
Altitude above starting point, ft.	..	70	1150

The conditions of the 1922 contest distinguished between the following groups of machines:

1—Soaring machines, which compete on the basis of minimum loss of altitude. These machines, con-

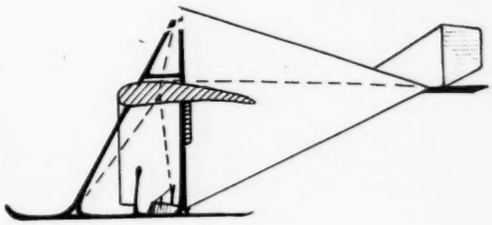


Fig. 1—Diagrammatic side view of von Loessl monoplane

trolled by rudder or wings, are classed only after a minimum performance of two flights of at least ⅜ mile in length or of at least 60 seconds duration each, with a mean loss of altitude not exceeding 5 ft. per sec.

2—Gliders controlled by rudder.

3—Gliders controlled by shifting the pilot's body.

Gliders of classes 2 and 3 must show a minimum performance of a flight of 3/16 mile in length or 30 seconds in duration.

The most successful machines competed in Class I. The von Loessl monoplane illustrated in Fig. 1, has a strong triangular frame mounted on the skid carrying the pilot's seat. Stay wires extend from the outer junction points of the wings to the two bottom points of the triangular frame. Each wing is in two parts and both parts may be twisted around the axis of a spar. Hence, the angle of incidence of each wing may be changed separately or both may be changed together during flight. Motion in the same direction produces an elevator effect, while motion in opposite directions produces a rudder effect.

Features of Successful Machines

The most successful machines of the contest were those with a body of smooth simple lines with the pilot's seat in front and the wings internally braced and mounted comparatively low on the body. A great deal of interest attaches to the machines constructed by students of the Darmstadt Technical College. These students design and build their own machines and they were quite successful even in the 1921 contest. For 1922 new machines were developed. Fig. 2 illustrates the Edith soaring machine built at Darmstadt. It is a monoplane with rigid wings, each wing being stiffened by two inclined struts to the bottom of the fuselage. The wings have two spars of I-section with torsion struts. The main ribs of the wings are placed a foot apart, secondary ribs in between helping to maintain a good wing profile. The leading edge of the wing is covered with plywood.

Transverse control is by ailerons, and these are so designed that when they are operated no slot is formed between the wing and the aileron, hence there is no chance for losses due to equalization of pressure through the slit. Moreover, the entire control mechanism for the ailerons is located inside the wing. The fuselage is covered with plywood, which is supported by 11 transverse ribs. At its rear end it runs out into a horizontal edge to which the tail planes are attached. The elevator, which has a surface area of 32 sq. ft., may be mounted or taken off by three men in three minutes. The rudder has an area of 16.5 sq. ft. and may be mounted or taken off by a single man in one minute. The mounting of the wings requires only five minutes on the part of six men. All of the control wires are concealed inside the fuselage and wings. The landing gear comprises a flexible ash skid which has proved quite serviceable. The wing loading is 2.25 lb. per sq. ft. "Edith" was designed by Erik Thomas and built in the students' workshop, and the opinion was heard that it was the best-built machine of the 1922 contest.

Among the many flights made with Edith the most remarkable were the curves and figure 8s described by Botsch. In a long soaring flight Botsch described six figure 8s around two points only 500 ft. apart, gaining considerable altitude. He also described four full circles around one of these points and then continued the flight, thus proving that stunts may be accomplished in soaring flight the same as in power flight. Another remarkable performance of Botsch consisted in starting his machine half way up the Wasserkuppe and landing at the top of the hill.

Fig. 3 illustrates the "Geheimrat" machine designed by Hoffmann and Nikolaus, students at the Darmstadt Technical College, but built in the plant of the Bahnbedarf Works. The wings are internally braced and without struts and wires. Both of the wings may be warped simultaneously around the main wing spar, and, besides, the tail plane may be adjusted during a flight. This latter feature, used in conjunction with the elevator, represents the first attempt to utilize a greater range of wind speed for a soaring machine, and to adapt the fuselage to the mo-

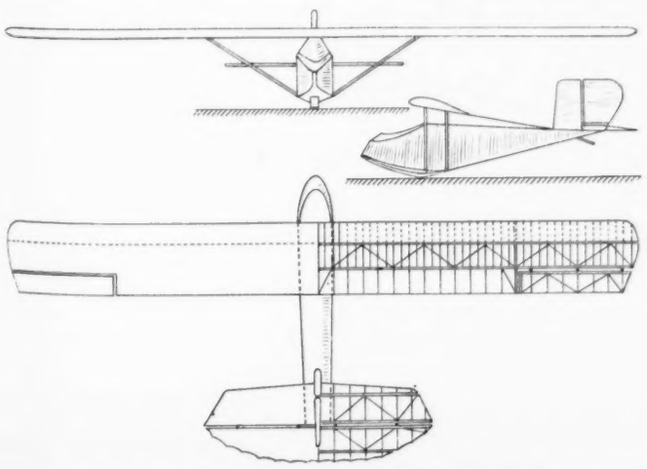


Fig. 2—Views of soaring machine Edith

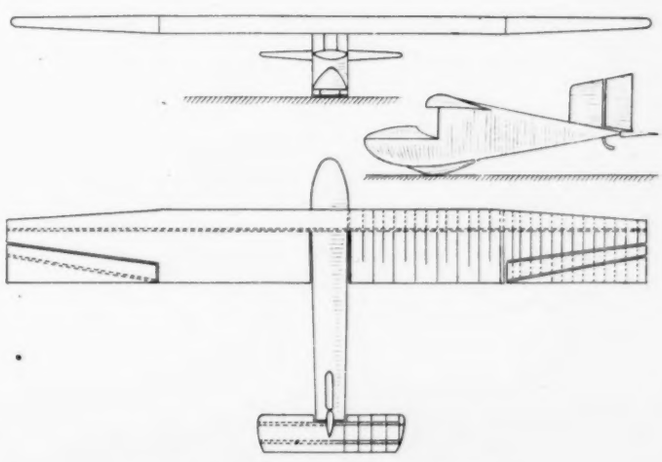


Fig. 3—Views of the "Geheimrat"

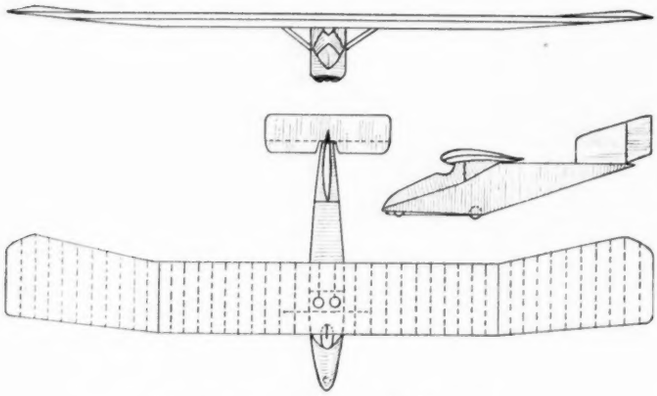


Fig. 4—Drawings of the Vampyr

mentary air resistance. It proved an evident success. The pilot Hackmack succeeded in hovering in the air over the same point for more than a quarter of an hour and some of the experts value this performance more highly than flights of long duration. However, Hackmack also made a flight of 1½ hours' duration, ascending to an altitude 1100 ft. above his starting point. The wings of this machine are provided with ailerons with concealed control cables, and they may be taken off after removing two bolts, an operation requiring 8 minutes. The fuselage is of rectangular section and is covered with plywood. Attached to its rear horizontal edge are the tail planes. The landing gear consists of two skids of sheet Duralumin, between which and the fuselage is inserted an air cushion.

Construction of the Vampyr

The most sensational duration flights were performed by the machines designed by Prof. Dr. Proell and Dr. Madelung of the Hannover Technical College, and built by the Hawa Works in Hannover. Fig. 4 shows a scale drawing of the most successful Hannover machine of the contest, the Vampyr, with internally braced wings. The depth of the wing, which is 4.7 ft. over most of the length, increases toward the outer end, and the rear edge toward the outer end is made resilient so as to permit of warping. The wing loading is 1.53 lb. per sq. ft. To keep down the wind resistance the pilot is placed with his head on the same level as the leading edge of the wings. In order to facilitate transportation of the machine, the wings are made in three parts, the middle part having a uniform profile and a thickness of 10 in.

The main wing spar is of I-section and is placed in the line of the center of pressure. Wing ribs are spaced 20 in. apart and secondary ribs are placed between them. The leading edge is covered with plywood. The center part of the wing rests on the body at three points and is secured to it by bolts. The fuselage is of rectangular section and covered with plywood. The forward part is made up of two strong ash arches extending back to and connecting with the main rib. The landing gear consists of two foot balls set into the under side of the fuselage, with less than half of their surface projecting, so that their air resistance is slight. A third ball at the forward end of the fuselage protects that portion of the machine against damage in landing. This simple landing arrangement has proved entirely serviceable. This machine made several long flights, including the flight by Hentzen of 3 hours 10 minutes duration, during which an altitude of 1150 ft. above the starting point was attained.

The Greif Glider

From the Hannover Technical College came another machine known as the Greif, which was designed by Martens and Hentzen. As may be seen from Fig. 5, the fuselage is of elliptic section and streamline form. Here, too, foot balls are used for the landing gear. The pilot's head is located in a recess formed in the leading edge of the wing. The general design of the wings, tail planes, etc., is the same as on the Vampyr. In spite of its lower air resistance and lesser weight, the Greif did not perform as well as the Vampyr, probably because the latter is an improved machine of the 1921 contest and the pilots had become familiar with it.

The well-known Dutch airplane manufacturer Fokker came over and brought with him two soaring machines which he flew unofficially. Both machines were put together inside of ten days in the Fokker works at Amsterdam and were transported to the Wasserkuppe on motor trucks when the contest was nearly over. Fig. 6 shows the Fokker two-seater biplane. Pilot and passenger sit side by side in the fuselage between the fabric-covered wings. The fuselage is of streamline form and is mounted on a central skid curved upward at the forward end, while the rear end is arranged to yield freely. This not only provides an excellent suspension but also permits of readily changing the angle of incidence in starting and landing, by the pilot and passenger merely throwing their weight either forward or back. No tail skids are used. In order to prevent excessive lateral tilt of the machine in landing loops of pressed steel are secured to the ends of the wings.

Other Details of Construction

A comparatively large gap is provided between the two planes to minimize interference. Since the lower plane is only 2 ft. above the ground, the total height of the biplane is only 7.4 ft. The lowness of the bottom plane, moreover, makes it possible to use the resiliency of the air trapped between it and the ground, in reducing the shocks of landing. The planes are neither staggered nor do they have a dihedral; they are trussed by seven struts of which four are along the leading edges. The whole plane is warped or twisted around the front spar, the rear struts rising and falling, while the front struts remain stationary.

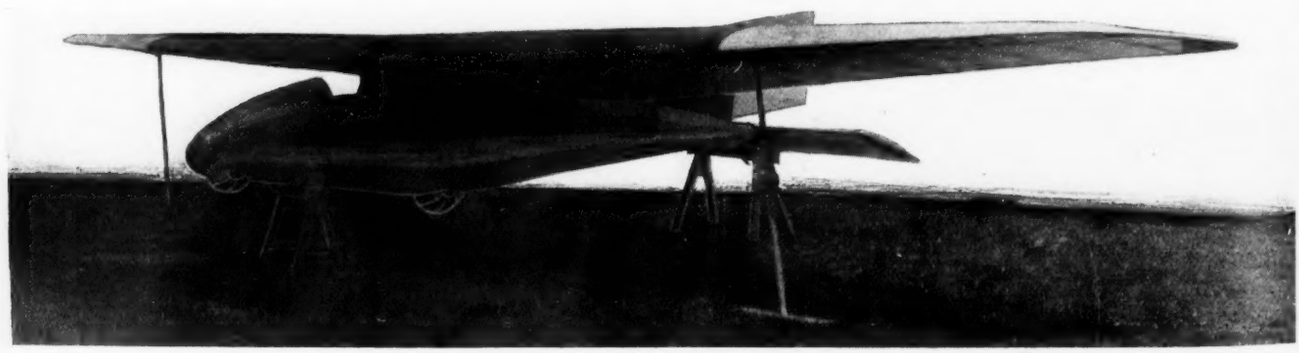


Fig. 5—Soaring machine Greif

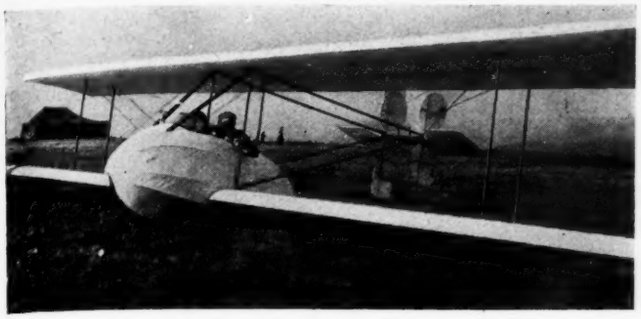


Fig. 6—Fokker's soaring biplane

The tail planes of the machine comprise a large, balanced elevator without stabilizer and two balanced rudders without fins. The planes are connected to the tail by four longerons which end at the rear in a horizontal edge and connect to the planes at the junction point of the rear central strut. Fokker also exhibited a single seater designed on the same lines and differing only in dimensions. Both machines have lever control. Compared with the other machines which took part in the competition, the wing loading of the Fokkers is very low. In the case of the two-seater it is only 1.43 lb. per sq. ft., as compared with 2.75 lb. per sq. ft. in the case of the Hannover. When the Fokker is flown without a passenger the wing loading is only one-third that of the Hannover. The result is that the Fokker can soar even in very light winds. After the close of the contest Fokker made a flight with a passenger of 13 minutes duration, which constituted a world's record.

Soaring Seaplanes

In connection with the land soaring machines described in the foregoing, mention should be made of the fact that as early as 1920 the Luft-Fahrzeug Gesellschaft of Stralsund made its first test of a soaring sea-plane without pilot under the direction of chief engineer Baatz, and early in 1922 their soaring seaplanes were first flown by pilot. This machine (Fig. 7), carrying a pilot, can start from the surface of the water by wind power alone. This machine succeeded in starting from the water in a wind of 27 m.p.h. and was steadied during its flight by a small jolly boat acting as a drift anchor. Soaring seaplanes, after having risen from the water, must continue to rise, and this problem Baatz claims to have solved.

It is admitted that a further development of the method of starting is desirable, and it has been proposed by Prof. Kurt Wegener that the machines should be carried to greater altitudes by means of the starting cable, the same as meteorological kites, and then freed from the cable by the pilot. In this way an altitude suitable for soaring could be readily attained. The machine could be started by means of an automobile to which it could be attached with a cable some hundred yards in length. Or it could be started by means of a power windlass, the same as meteorological kites. It could then land at the starting point and the troublesome dragging up the hill would be avoided.

An outstanding difference between soaring machines and motor-propelled airplanes lies in the much smaller wing loading of the former. The ordinary airplane has a wing loading of about 10 lb. per sq. ft., whereas in soaring machines the wing loading is limited to 1.4-2.5 lb. The largest soaring birds (vultures) have a wing loading of 1-1.25 lb. and smaller soaring birds (sea gulls), 0.8-1 lb. In the birds any differences in wing loading are compensated for by speed. Two birds with the same wing area, of which one is twice as heavy as the other, may be equally good soarers if the heavier one is correspondingly faster and its wings displace the same amount of air in the unit time. If the size of an airplane is increased, the wing area increases as the square of the linear dimensions, whereas the weight increases as the cube, hence an airplane of the same speed by larger dimensions works less economically, its load carrying capacity not increasing in proportion with the engine power and fuel consumption.

How Speeds Were Increased

Diminution of the frontal resistance so as to increase the speed is another requirement, and this is best accomplished by omitting all exposed stays and struts and using internally braced wings. Increasing the speed is practically the same as decreasing the wing loading, and with an engine-propelled airplane it means greater fuel economy. The speed of the plane also determines the wing profile: the lower the speed the more curved the profile must be. The sea gull with a soaring speed of 20 m.p.h. has a more curved profile than an airplane with a speed of 60 m.p.h. The speed of our best soaring machines is 25-30 m.p.h. The dead weight is reduced by making the elevator a carrying member. On the whole the rudder and elevator must be larger, proportionally, than in a motor-propelled airplane, as the speed of the soaring machine is only 28-48 m.p.h., whereas the speed of airplanes is from 100 to 150 m.p.h.

It is predicted that the application of glider experience to the design of motor-propelled airplanes will result in the development of a light sport type plane of less speed and climb than present types but safer and far cheaper. The sole purpose of the engine would be to carry the plane to an altitude where soaring would be possible. A rule for determining the required engine power has been given by Prof. A. von Parseval. If a climb of 3 ft. p. s. is desired and the gliding angle gives a drop of 2.4 ft. p. s., then the engine power required (neglecting losses) is such as would produce a theoretical climb equal to the sum of the two figures, viz., 5.4 ft. p. s. Allowance must then be made for propeller losses, which for a propeller of 5 ft. diameter and a speed of 46 ft. p. s. (67 m.p.h.) are estimated at 30 per cent. This gives for the height through which the plane must be lifted per second,

$$5.4/0.7 = 7.7 \text{ ft. p. s. or } 463 \text{ ft. p m.,}$$

Fig. 7—Stralsund soaring seaplane

hence with a total weight of 450 lb. the horsepower required would be

$$\frac{450 \times 463}{33{,}000} = 6.3 \text{ hp.}$$

With an engine of this small size the sporting type airplane would have exceedingly little head resistance, and particularly the parasitic resistance due to the engine itself would be very small. Of course, the addition of the propeller would be a disadvantage from this viewpoint. Starting would be accomplished as with an ordinary airplane.

If soaring flights were to be made on the plains where there are no hills suitable for starting, the airplane could be started with only as much fuel on board as is necessary to climb to the desired altitude. In the case under consideration an altitude of 1600 ft. would be suitable, and a little more than a quart of fuel would enable the airplane to reach this altitude.

DATA OF SUCCESSFUL GERMAN SOARING MACHINES

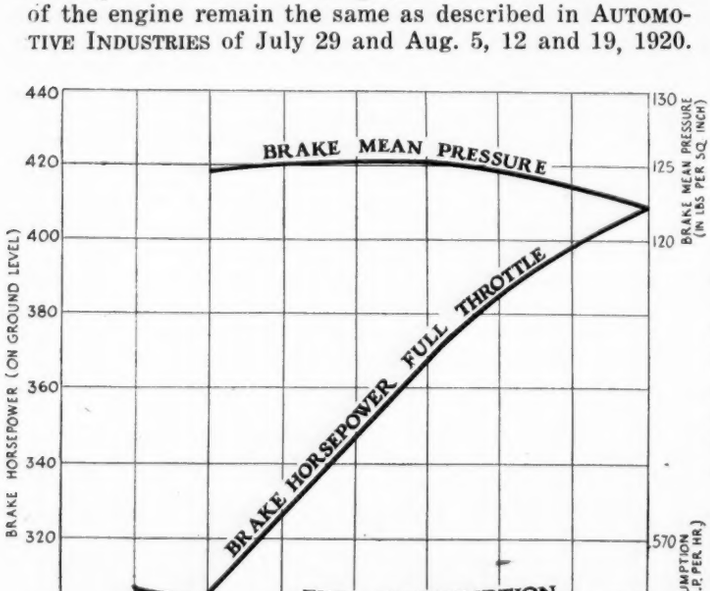
Name	Span (ft.)	Length (ft.)	Height (ft.)	Wing Area (sq. ft.)	Weight (lb.)
Barth Messrschmidt	46	14.8	4.25	204	176
Von Loessl	39.5	18	6.6	183	
Edith	41.5	18	5.25	175	200
Geheimrat	40	18	4.25	154	176
Vampyr	41.25	18		172	264
Greif	38	16.4	3.6	162	192
Fokker biplane	39.4	21.4	7.4	388	220
Fokker single seater	29.5	21.4	7.4	290	165
Stralsund	53	23			

Improvements Made in Rolls-Royce Aircraft Engine

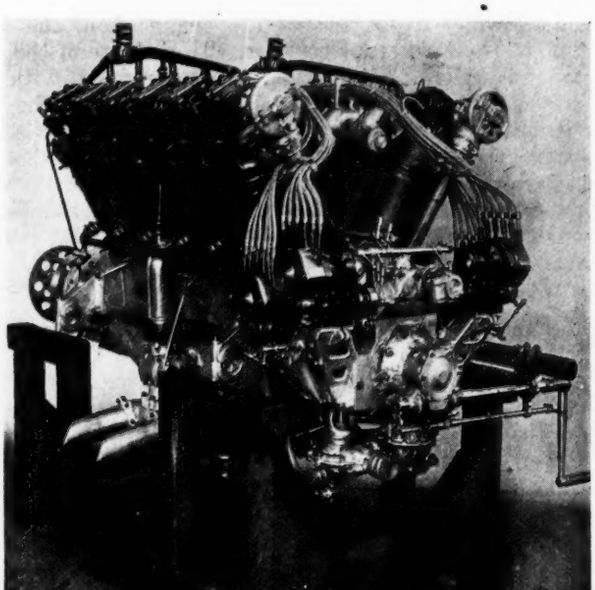
COMPARED with previous models of the Rolls-Royce series of aircraft engines, the first of which was brought out in 1915, the latest model (Eagle IX) embodies features rendering it more suitable for commercial use.

The following advantages are claimed for this new model: Greater simplicity, due in part to the use of two carbureters in place of four, and a new form of inlet tract, features which facilitate engine tuning; gravity fuel is permitted by changes made in the float feed system, the engine functioning satisfactorily with a head of fuel only 8 in. above the crankshaft center line; the risk of fire has been reduced by alterations in the design of the carbureters; smoothness of running has been enhanced, and the engine possesses better wearing qualities.

The accompanying power and consumption curves, which represent the average performance of engines now in production, give an idea of the power and efficiency of the model. The general mechanical features of the engine remain the same as described in AUTOMOTIVE INDUSTRIES of July 29 and Aug. 5, 12 and 19, 1920.



Torque, horsepower and fuel consumption curves of the Eagle IX



The new Rolls-Royce Eagle IX aircraft engine

Sulphation of Storage Battery Plates

THE life and efficiency of storage batteries depend upon the purity of the materials used in constructing the plates and on the purity of the electrolyte. But little exact information is available on the effect of impurities in the solution which serves as the electrolyte, and the methods ordinarily employed for determining the effect of such impurities are time-consuming and often inaccurate.

A new method has been devised by the Bureau of Standards for measuring the rate of sulphation of the plates resulting from local action. This method is rapid and accurate, but requires some special apparatus. By this method a study has been made of the rate of sulphation of both positive and negative plates in solutions of varying concentration. The results are described in Technologic Paper No. 225 of the Bureau of Standards, which may be obtained from the Superintendent of Documents, Washington. This paper covers the first step in a more extended investigation of the effect of impurities.

Temperatures in Water, Air and Steam Cooled Cylinders

Two engineers take issue with Heron in his comparison of cooling conditions. Rushmore contends that high temperatures of cylinders in contact with water are impossible. Successful air cooling difficult.

Editor, AUTOMOTIVE INDUSTRIES:

S. D. Heron's communication, "Air and Water-Cooled Engines Compared,"* contains a great deal of useful information upon air-cooling, but it seems to me that his remarks as to the temperature of water-cooled cylinder walls show such profound lack of information as to standard locomotive and power-plant boiler performance as is observed among automotive engineers generally, as to be really pathetic.

One would suppose from Heron's statements as to the high temperatures he has observed in the cylinder walls of water-cooled engines that he really believes that a metal surface in contact with water can be maintained at a temperature hundreds of degrees hotter than the water.

The mere fact that he has observed such high temperatures in the walls of water-cooled engines is sufficient proof that water was not present over the overheated areas. The simple fact that seems to have escaped many automotive engineers who have had trouble with water-cooled engines is, as A. L. Clayden has so convincingly set forth, that with the thermo-syphon system, assisted in many cases by a feeble little centrifugal pump, the water is expelled by steam from certain restricted passages in the jacket space, leaving exposed surfaces to become positively red hot.

ONLY the briefest reference to the reports of the locomotive tests at Purdue or of the boiler forcing tests at the Delray station of the Detroit Edison Company is sufficient to show the utter absurdity of the notion held by Heron and by so many of his fellow automotive engineers that it is possible to have excessive temperature difference between metal and water in contact therewith. The mere fact of the high wall temperatures observed is sufficient proof that water simply wasn't there.

Heron's reference to "the deliberately sluggish circulation used with steam cooling" shows that he has little idea of the actual working of the Rushmore system for, as a matter of fact, the positive acting gear pump employed with that system circulates much more water per minute than is circulated by the thermo-siphon or, probably, by any centrifugal pump system.

While no one pretends to claim any considerable circulation with the thermo-siphon arrangement, very few seem to realize that the feeble little paddle wheel or centrifugal pump, with its rotor seldom more than 3 in. in diameter, does not exert any considerable pressure except at the very highest speeds and that, usually, it just quits altogether when steam pocketing begins.

AS it seems almost futile to explain to many automotive engineers that water and fire will not mix I suggest that the doubting Thomases settle the matter for themselves by applying some solder to the bottom of an iron pail and then turning on the most powerful gas torch and see if they can melt the solder while any water remains in the pail.

After trying this experiment I believe the average automotive engineer will not reach for his gun, as he now so often does, at the mere mention of "steam" cooling.

S. W. RUSHMORE.

IN a communication which appeared in the Forum under date of Nov. 30, 1922, S. D. Heron gave data tending to show that there is little difference between air and water-cooled engines in respect to maximum temperatures, fuel consumption, power output per unit of volume and reliability.

In his reply to Heron, S. W. Rushmore points out that the temperature of metal in actual contact with water can never be more than a few degrees above that of the water, and that the real fault with water-cooled engines lies in the fact that steam pockets, formed adjacent to the metal, permit the latter to assume excessively high temperatures. Use of a positive pump with properly designed jacket will prevent this difficulty.

High Temperature Limits Power Output

Editor, AUTOMOTIVE INDUSTRIES:

Without question there are very few people in the world who know as much about air cooling as S. D. Heron. Consequently in commenting upon my remarks

*See *Automotive Industries* for Nov. 30, 1922, p. 1087.

on cooling Heron thinks of the air-cooled engine as he knows it can be made, while I was considering the air-cooled engine in the average as it is and has been applied to automobile work.

The production of the very highest type of engine for any form of cooling is very difficult, and I believe I am correct in saying that it is temperature conditions which now limit the mean effective pressure attainable in aviation engines, where it is possible to consider only special fuels. In any case, modern aviation engines operate with an m. e. p. at least 40 per cent greater than that of the ordinary car or truck.

Much more is known about the design of air-cooled engines for aviation work than for any other type of service. A very much higher standard of workmanship makes possible constructions on either air or water-cooled cylinders, which are out of the question for quantity manufacture. In stating, as I did, that the temperatures in air-cooled cylinders were extremely high as compared with water-cooled practice, I was thinking of the fact that all automobile air-cooled engines with which I am acquainted utilize piston clearances that allow for much more expansion than is conventional with water-cooled constructions. Also the majority of automobile air-cooled engines have a lower compression ratio and a lower m. e. p. than the average. It is without question possible today to start production of a new design of conventional water-cooled type with fair assurance of commercial success. It is unquestionably much more difficult with air cooling. It is the writer's belief that some form of vapor cooling will demand no greater degree of engineering knowledge for the design and no better grade of workmanship than does the water-cooled engine.

In conclusion I would like again to draw Heron's attention to the fact that one of the advantages of vapor cooling, which appears to be most attractive, is the automatic provision of constant temperature. This is not too easy with water cooling, and is still more difficult with air cooling. It is conceivable that the best average temperature for the cylinder block of an automobile motor may be anywhere between 150 deg. and 250 deg. Fahr. I mean best average from the combined viewpoint of fuel economy and lubrication. Anything in this range is obtainable by vapor cooling and the use of vapor cooling ought to enable us very quickly to determine the all-around most suitable temperature. Data obtained from the use of vapor systems ought to be of value in the future to designers of air-cooled engines for automobile work.

The aviation engine is really a different subject and becomes more different every day.

A. LUDLOW CLAYDEN,
Chief Engineer, Gas Engine Research, Sun Company.

Radiator Nomenclature

Editor, AUTOMOTIVE INDUSTRIES:

I indorse cordially every point brought out in the article on Radiator Nomenclature (AUTOMOTIVE INDUSTRIES, Nov. 16, 1922, p. 971). While you are at liberty to quote this as my personal opinion on the subject, please bear in mind that it is not an official commitment of the Bureau. However, the Bureau would surely indorse the general proposition of a need of standardization of terminology in radiator descriptions, for the lack of uniformity of nomenclature today cannot be disputed.

Although the Bureau might hesitate without a more extended consideration to lend its indorsement to the particular standardization scheme you outlined, I consider it good and can think of no suggestions to offer for its improvement.

It may interest you to note the attitude we displayed in our recent booklet on "Aircraft Radiators" regarding the classification terms "cellular," "honeycombs," etc. We employed such terms in tables or properties where it really made little difference whether or not the reader could visualize the type of core correctly except in a most general way; but in all those tables where it was important to show just what type of core was meant, it was necessary to make a sketch, and then we did not deem classification terms of the kind mentioned as being definite enough to be worthy of inclusion in the headings.

D. R. HARPER, 3D,
Physicist, Bureau of Standards.

Shows Big Help to Industry

Editor, AUTOMOTIVE INDUSTRIES:

No amount of promotion work could have made it possible for the national automobile shows to grow year after year if the public did not want them, or if the automobile industry itself did not want and value them. The automobile industry can point with pride to the fact that the twenty-third annual automobile show of the national automobile Chamber of Commerce was held in 1923.

Mr. Hawkins takes a negative viewpoint in every phase of the automobile show's place in the industry. He ignores the good things about the national auto show.

We can point out instance after instance, particularly at the national automobile shows in 1922, when the real life blood of volume business did not begin to flow into the factories until after the automobile shows. The shows started volume buying in 1922.

Shows have always been looked upon as a sort of starting gun in the year's business. Can we say that we have reached the point in the automobile industry when we do not need inspiration, encouragement, a common meeting place? Just as soon as men or industries begin to think back-sliding thoughts, they begin to backslide.

To the general public the automobile show represents an exposition not only of new merchandise but the progress of automotive transportation and all that it means. It presents the most popular phase of one of the prime essentials of civilization. The others are food, shelter, clothing and fuel, but transportation makes all of the others possible to all people no matter how remote.

The public is entitled to inspect the offering of the automobile industry, to see the advancements that have been made in the interests of their service and the values which have been developed, and to do this in the most convenient manner, at convenient intervals, which is a central place where they can encompass the entire industry and closely compare all the products.

Instead of confusing the customer the show enables him to compare and eliminate concretely, conveniently, and feel satisfied that he has for once covered the market and therefore satisfied with his choice. And no matter what his choice, such satisfaction is good for the whole industry. It encourages competition which is the life of trade.

To those manufacturers and sales organizations who deserve it, the favorable comment of those who attend the automobile show is an encouragement to greater improvement in their product and in their service to their patrons.

The automobile show is an occasion for the automobile trade to get together more closely, not only with the public within itself, and for all of its ramifications to come to light, for all of its departments to be made known to each other. Anything which stimulates the public interest in the industry, anything which so impressively demonstrates

the interest of the public in an industry which serves it and from which the public benefits should not only be continued but developed for the advancement of those mutual relations.

J. H. NEWMARK,
Manager Sales Promotion,
Durant Motors, Inc.

Public Demands Displays

Editor, AUTOMOTIVE INDUSTRIES:

It is our impression that the attitude of the public toward the show is a favorable, as well as desirable one, both for the dealer and the industry, and it is so because the motor car dealer and the motor car manufacturer apparently put more into the show than he takes out.

The automobile show would seem to serve three purposes. It bridges the selling season and keeps the motor car interest alive when it would ordinarily be at a low ebb; secures new prospects for the individual dealer in the ranks of car owners, and helps create prospects out of non-owners; and we believe in addition, it inspires the dealer's sales staff to greater efforts and enthusiasm for the product.

On the other hand, there is the danger, after the show has been concluded, in the possibility that the sales organization will display a slackening in activity.

It is well to keep in mind the fact that the definite and tangible results of the show are in definite proportion of the efforts contributed to the success of the show and that they really materialize during months following the show.

The attitude of the public toward automobile shows cannot be ignored as is evidenced by the fact that the public is still willing to pay the price of admission for the privilege of looking at the manufacturer's product. As long as they feel they are getting something out of a show, manufacturers and dealers will probably continue to pay attention to the desire of the public to view the improved product from season to season.

M. I. REID,
Director of Sales,
Maxwell Motor Company of Canada, Ltd.

Book Review

A PERUSAL of the work, "Modern Motor Car Practice," leaves no doubt that it is written mainly for those whose interest in motor cars is that of users or commercial men. The book, which is edited by W. H. Berry, is the work of about a dozen writers, some of whom, at least, are well known and highly competent specialists in the branches on which they write.

The general conception of the work seems to be about the same as that of "Motors and Motoring," by Alfred Harmsworth and other writers, which was a well-known handbook in the early days but has now become obsolete. In addition to chapters on all of the principal components of the car there are others dealing with subjects related to the use of automobiles, such as, Law Concerning Motors and Motoring, Roads, etc. Two chapters are devoted to repair work, one being on Welding Repairs and another on Tire Repairing by Vulcanization. There is also one chapter on X-Ray Examination of Materials, which seems somewhat outside the general scope of the work, as it is a highly specialized subject.

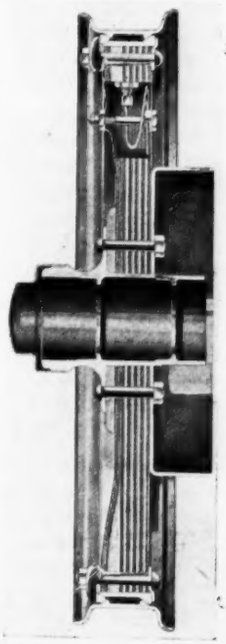
As might be expected in the case of a work contributed to by a considerable number of writers, the method of treatment of the subjects and the accuracy of statement vary in different parts of the book. The names of some of the contributors, like Dr. Hele Shaw on Clutches and David J. Smith on Producer Gas, guarantee authoritative treatment, but some chapters are very much open to criticism. This applies particularly to the chapter on Ignition and Electric Equipment, which opens with the statement that "The development of electric ignition apparatus is primarily responsible for the modern motor car engine," and follows it up with "Without it no perfection of mechanical construction would have been possible."

These statements are far from self-evident, and we doubt whether anybody who has been connected with other phases of internal combustion development than that of ignition would admit their truth. Everybody realizes the great importance of reliable ignition in the operation of an engine, but there are other factors that must be right also. Again, in another section of this same chapter the statement is made that "The means adopted in all modern internal combustion engines for motor vehicles * * * is to provide an electric spark which takes place between two insulated electrodes of a sparking plug * * *" That both of the electrodes are insulated is extremely rare.

The book is published by the Oxford University Press and may be obtained from the American branch.

Laminated Wood Wheel with Easy Inflation Feature

CURVDISC wheels, manufactured by the Hopkins Manufacturing Company, are made of hard plywoods, laminated with cross grain under pressure and secured with waterproof cement. The method of construction used is claimed to give great strength and to prevent splitting, warping and shrinkage. Particular strength in respect to lateral stresses is claimed. As may be seen from the sectional view herewith, the front is formed with a curve, which apparently is done for the sake of appearance, while the rear side is made absolutely straight, to facilitate the attachment of the brake drum and hub flange.



Attention may be called to the arrangement of the valve stem, which makes it easy to inflate the tire. It is only necessary to release a small cap nut at the front of the wheel and apply the hose of the pump. In changing tires, connection with the tube valve is said to be easily made regardless of the length of the valve stem.

These wheels are made to take demountable pneumatic tires from 30 by 3½ to 34 by 4½ in. and giant pneumatics from 34 by 5 to 40 by 8 in. Similar wheels with straight disks are made to take demountable bus pneumatics of from 30 by 5 to 36 by 8 in. and solid tires of all sizes.

Peace and Efficiency in Industry Depend on Understanding

Permanent eradication of unrest in production field must come from unity of purpose among all members of organization. When employers are interested chiefly in stockholders and workers in unions, compromise must result.

By Harry Tipper*

THE difficulty in the human side of industry arises primarily from the fact that little study has been given by engineers, factory men and business men to the human factors. They have been accustomed, it is true, to estimating the capacity and the quality of the individual in their employment of many people and they have succeeded in keeping these people at work in a more or less orderly manner by virtue of their capacity. Little has been done, however, in the general study of human relations or in the application of the things which are known in one sense, to the problem which appears in another sense entirely.

It is my object in this little talk to suggest some of the fundamentals in the relation between the worker on the one hand, his union on the other hand, and the manager.

The average approach to the human question in industry is clouded by the apparent idea that workers are made for industry, whereas, of course, it is obvious to the thinking man that industry is made for man and not otherwise. All methods of organizing, managing and improving the operations of groups of human beings must be considered from their effect upon men themselves in order to discover their true effect upon the operations of industry. This is perhaps a technical way of saying that methods of organization, which do not improve the work, the workers' position and working conditions, will not improve the production result except temporarily.

In what respect is the worker different from the supervisor or executive? You know that you have already visualized some ambitions toward which you will work when your college career is ended. These ambitions may change as you grow older, but they will still exist. You know that you have definite interests in the work you do and definite objections to doing other work. These also may change, but they will continue to exist. There are other things, however, which you may not have recognized in your own approach to any matter, that are of equal importance.

WHY is it that you are interested in some work and not in other operations? At this point we must get rid of one fallacy that still exists, probably due to the idea that man is made for industry. You have seen and heard a lot of discussion about the incentive to work. This is frequently referred to as the natural incentive to work, but is there such a thing? Have you ever felt an incentive to just labor? Is it not rather an incentive to accomplish something, which impresses the imagination sufficiently that you will undertake the rather distasteful labor to achieve the accomplishment.

As a matter of fact, the history of production has shown that man constantly uses increased diligence in his operations to escape the more arduous labor in order to leave himself free for greater accomplishment.

Frank Gilbreth once hired a bunch of crude laborers to move bricks from one part of the yard to the other and then instructed them to move them back, but the men quit. They said nobody could make fools of them, even if they were paid. They were not interested in useless labor. They had no incentive to work. When the accomplishment became invisible they were not interested in laboring any longer.

FROM time to time I imagine you have been bombarded with the old bromide that experience teaches, but perhaps you have not bothered to translate this expression into its real terms, that human beings have always educated themselves through their work. For most people their life's work is the most important educational factor. In order to educate, however, work must represent an accomplishment, which cannot be obtained easily, but which presents possibilities of a greater degree of skill and proficiency even after long periods of practice.

If you have indulged in the athletic exercises in your stay at the University and have followed the work of your university teams, you have learned that no team can continue to accomplish anything unless confidence is fully reposed in the leader by each member of the team. The same state of affairs exists in every organization. The effort put out by the worker is almost in proportion to his confidence in the management. Suspicion, disagreement, misunderstanding, ignorance impair the confidence and frequently destroy it.

This little excursion into psychology indicates that the worker is interested in his work only when he can see some accomplishment or usefulness out of it. It shows that the worker has ambitions and these ambitions either lead into the work because that work offers possibilities or they lead out of the work because the possibilities lie outside. Further, the work is educational to whatever degree the possibilities of the work itself demands ex-

*Abstract of an address delivered to the students of Purdue University at Lafayette, Ind., Feb. 13.

perience. And further, the worker desires development and expects to get it out of the educational value of his work. Fourth, the worker demands the kind of ability in the leader which will give him confidence so that he can work without being troubled as to the place he will secure on the team or the credit he will get for his operations.

CONCEDING that industry is made for man, let us examine how efficiently industry fulfills these necessities of the workers, for they are necessities, although the worker may not know that himself. They are the fundamental cause of his satisfaction or restlessness, whether he is able to express them in these terms or not.

At the beginning of the industrial development of the United States, most of the factories employed less than a dozen people and very few had more than 50. The boss or the employer was a superior workman, also possessed of more intelligence in the work. Because he was working alongside the other men, they looked up to him as a real leader. They could appreciate the skill and give that respect which is conceded from one good craftsman to a better one.

At this time, in 1923, the picture is entirely different. The employer is concerned with work of so different a character that it is neither understood nor is it impressive to the worker. The leader who impelled more by his superior skill has become the boss who controls by his power. The machinery with which the man works has become so skillful that the amount of skill required in the worker is very small. Full proficiency may be acquired in a few weeks in most cases. Consequently, the accomplishment is unapparent and frequently almost invisible. The average worker sees an infinitesimal fragment of the total job and operates on it momentarily in its passage toward final usefulness. It is for this reason the worker feels that he has lost his economic place. Largely for this reason has he lost his interest in working and stays at it only for the money. Largely for this reason he has come together with greater solidarity with his fellow workers so that the monotonous hours of labor could be shortened, the reward increased and time allowed for the real interests of his life, which are not in the work, but are outside.

Out of these circumstances has arisen the union. The worker gradually lost his natural leader, his confidence in his employer and his visible accomplishment. He found he had to have protection from his employer because an individual was of no importance where so many were employed. He found it necessary, as all human beings do, to provide himself with a leader and to invent accomplishments. So, the union grew up. The labor leader became the leader of the workers. The solidarity of the union forces became the protection of the worker. The aims and objectives of the union became his ambition of accomplishment and the program of union development his probable reward.

CONSEQUENTLY, the manager of the present day finds that he is responsible for the conduct of an organization divided against itself, with no unity of purpose and no common ground of agreement. In most cases the workers do not admit allegiance to the employer. If they have any allegiance at all, it is to the union. Similarly, the employer or the owner do not admit that they owe any allegiance to the workers. If they show any allegiance, it is to the stockholders. Responsible to the stockholders for profit and to the workers for order and justice, the manager of industry is faced with the task of attempting to keep this divided organization at a common purpose of production with as high efficiency as possible.

Production efficiency begins and ends with the human equation. Where there is no interest in the work and no confidence in the management, there is a direct tendency to do as little work as possible. Consequently, the union's pace is established toward the minimum. Where the work requires no great skill, there is little incentive for accomplishment and the desire for good workmanship dies out.

For this reason we have the complaint that workers do not seem to be interested in doing good work like the older craftsmen were. When there is no sense of moral responsibility on the part of the employer, there can be no sense of allegiance on the part of the worker and where there is no sense of allegiance the labor turn-over is great; the efficiency correspondingly decreased.

How then is the manager to proceed in his attempt to improve the situation? There are three points of attack, all of which have been the subject of experiment in several hundred factories to date.

The first of these is a frank and open discussion with the workers of all questions relating to hours of labor, wages and working conditions. There are many systems adopted for doing this and there are many informal methods of doing the same thing. They are variable about in proportion to the intelligence, honesty and patience of the management. It is well to remember that the worker is deeply suspicious of the employer in most cases and does not look with favor upon any advances the employer may make, so the employer must be willing to be repelled quite frequently until he has convinced his workers of his own sincerity. There have been too many broken contracts in the past, too many cut rates, too many discharges without visible reason, to make the background amicable.

THE second point of attack is the thorough study of the work itself and the effect it has upon the worker, the amount of fatigue due to the character of the work; the effect of that fatigue and the effect of rest, the relation of fatigue to production. This subject has not been studied sufficiently, especially the mental effects of fatigue, which have so important an effect on the physical condition.

The education of the worker in the usefulness of the work and the objects and the policy of the organization is more difficult and perhaps in some cases more important. Ignorance always breeds suspicion and lack of understanding is related to fear. Knowledge must precede a thorough confidence and there are many things the worker does not understand about the organization in which he is working.

It is my thorough belief that the only permanent solution for production peace and industrial efficiency is the establishment of the unity of purpose and understanding among the members of the same organization. So long as the employer's interests are principally to the stockholders and the workers' interests principally to the union, there can be no hope of a sound unity. We shall proceed from compromise to compromise, and from grievance to settlement with all the interruptions, waste and other incidental deficiencies.

The union is no less autocratic than the employer's association or the absentee's stock ownership. All of these forces are impelled by the motive of domination, not agreement. They must be reckoned with and then they can be brought into orderly relations through the individuals in the same organization. The examples that have been worked out indicate this.

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Danger in Further Inflation

WE have pointed out from time to time the danger of another period of inflation as a result of the rapid return of prosperity and the huge demand for commodities of all kinds. This has led to rising prices for labor, materials and finished products. The major items which make up the cost of living have not decreased materially and workers are not likely to accept wage reductions without a struggle as long as this condition prevails. Then, too, the farmer, with half the purchasing power of the country, can't buy manufactured goods if the prices go much higher.

The stage is set much as it was at the beginning of 1920 except that it would take only a short time to bring about a sharp constriction of industrial operations and that it would be accomplished with much smaller financial loss to those in a sound position. The February economic survey of the Labor Bureau, Inc., seems to summarize the situation fairly well when it says:

"For the time being at least there seems to be no indication of any immediate business decline. These conditions are likely to continue for some months at least. In the long run, of course, a period of depression and liquidation will come. When that will be depends largely on the loaning policy of the bankers and on economic developments abroad."

Cadillac Takes Wise Step

SERVICE parts for Cadillac cars now are on sale throughout the United States at a uniform cost, without war tax, freight or handling charges. The removal of tax and shipping charges means a material saving to Cadillac owners.

This announcement is of interest to the entire industry and the company considers it of sufficient importance to justify national advertising to owners. There is no reason to assume that dealers will not cooperate loyally in this effort to give better service, but they can't fail to do so if owners know the situation as it stands. The dealer's profit will be just as large as it was before.

The Cadillac company is to be congratulated upon the wisdom of the step it has taken. The question of replacement parts is of sufficient importance to warrant much greater attention than it has been given. Judging from the competition for the business, the manufacture and sale of these parts must be profitable. Vehicle makers seem anxious to sell through their dealers the genuine replacement parts their products may require, but they are meeting with strong competition from manufacturers who make parts to fit the cars and trucks.

In their efforts to control this business the car and unit parts makers themselves, and their retail representatives, are emphasizing to customers the importance of using only genuine parts. Their patrons are warned of the dire results if other than genuine parts are installed. This is a negative type of salesmanship, however, and, judging by the number of companies engaged in the manufacture of parts to fit, it has not helped materially to sell genuine parts.

Most people realize the futility of trying to sell one product by "knocking" a competitive product. In most car dealer establishments the practice is absolutely taboo. There is no reason to believe that calling parts made to fit by such names as "gyp" and "pirate" will sell genuine parts. Such tactics have not interfered to any great extent with the business of the makers of these maligned parts.

Better merchandising by the car and unit parts makers will enable them to get a larger portion of this business. These manufacturers must recognize the importance of the independent service station. A large percentage of all the cars in the country are dependent on these stations for service. The proprietors of these stations must be shown that they can profit most by selling genuine parts. The makers of

non-genuine parts reach these men and sell them. They offer discounts which make it profitable to sell their parts.

Price is another important element to be considered in this connection. We know of an authorized car dealer who had an axle shaft to replace in a car of the make he represented. It would naturally be supposed that he would use a genuine part, but he didn't. In explaining why, he evidenced a sincere interest in the welfare of his customer. He installed a non-genuine part in this case because the price of the genuine part was too high, in his opinion. He said he would not ask his customer to pay the price asked for the genuine when the non-genuine part could be bought for so much less.

Perhaps the price of the non-genuine part was low because of poor material or workmanship. Perhaps the material and workmanship in the part was as good as in the genuine, but the price was low for the reason that the makers required a smaller margin above the cost of manufacture because of more economical distribution methods. There is little doubt, however, that the business of selling non-genuine parts receives material assistance from the wide differential existing between the prices asked for them and the prices asked for the genuine parts.

Industry Is No Longer Seasonal

PRODUCTION of nearly a quarter of a million motor vehicles in January was amazing even to the men who made them. It was the tenth consecutive month with an output in excess of 200,000. The record bettered that of April, which was 219,000, approximated that of May, which was 256,000, was almost equal to that of July with 245,000 and was within striking distance of June, the best month in history, with 289,000.

The showing was the more astounding coming upon the heels of December, usually the dullest month of the year, with 226,000. The last quarter of 1922 aggregated 700,000 which would have been highly satisfactory in the best quarter of any previous year. Another striking feature of the January production was that the output of members of the National Automobile Chamber of Commerce increased in comparison with December while that of Ford decreased.

Up to this time the industry always has felt that its business must of necessity be seasonal, but the events of the past ten months have done much to dissipate this theory. Time was when motor vehicles were put into storage with the first cold weather and kept there until the roads were dry in the spring, but much of this economic waste now has been avoided.

Better highways have made it possible to drive most of the year in nearly all sections of the country except when they are covered with snow and each winter brings an increasingly large mileage of rural roads which are cleared almost as well as city streets. There are comparatively few days in the year when it is not possible to drive motor vehicles in urban centers.

Better maintenance of highways has made possible winter operation of automobiles and the closed car has made winter driving comfortable. Recent surveys made by the Bureau of Roads show that trucks are used as much in winter as in summer.

These conditions are going far to stabilize the automotive industry. It has been demonstrated that there need not, of necessity, be any dull months in the year. This fact is of tremendous advantage both to manufacturers and dealers.

Gage Steel Investigation

THE Gage Steel Committee of the Bureau of Standards has recently issued its third progress report covering the investigation of the gage steel instituted some time ago. The report is in mimeographed form and shows what progress has been made on the three important problems of gage improvement, namely, wear resistance, dimensional changes on hardening and time changes.

Wear tests have as yet been largely confined to a study of the apparatus necessary in the formulation of standardized test conditions. The study of dimensional changes on hardening has involved consideration of surface oxidation and much of the report deals with this phase of the subject. The report contains preliminary observations on dimensional changes of chrome steel, gage specimens 4 in. long by 1 in. in diameter. The effect of time on dimensional changes is being studied, but the time which has elapsed since the samples were prepared is too short to show as yet the trend of the change.

The report gives the results of the canvass of manufacturers of carbonizing compounds, which seems to indicate that No. 2 Mix, composed of 50 per cent powdered charcoal, 25 per cent barium carbonate and 25 per cent char leather is in greatest favor.

Service Comes to the Fore

AUTOMOTIVE service in all its branches never has been given such serious attention as at present. It is gratifying that the Society of Automotive Engineers is taking such a deep interest in the service needs of motor vehicle operators and tangible results should come from the consideration which it is giving the subject.

Many persons within the industry seem to have considered service a necessary evil. They were little concerned with how the car or truck owners felt about it. Constant complaints of poor work and exorbitant prices caused little concern, although most of them undoubtedly were justified. In fact, a good many manufacturers have regarded the sale of service parts only as another source of profit.

The industry has learned of late, however, that sales and service are bound together inextricably and that those dealers and manufacturers who do not make an honest effort to meet the legitimate needs of their customers will be shunned in future.

Output in January Totaled 243,000

Record Set in 1920 Exceeded by 75,000

Increase Over December, 1922, Reached 17,000—Plants Operate on Big Programs

NEW YORK, Feb. 12—Factory schedules in the major automobile producing plants are higher this month than they were in January and are carrying out the prediction that the first quarter will be notable not only from the standpoint of output but likewise as regards sales.

Manufacturers are still adhering to the determination of last year that the ruling element in the volume of production should be the actual demand. Substantial orders placed by dealers at the New York and Chicago shows form the basis for present factory operations. Encouraging reports continue to be received from those sections of the country where slack buying has been extended over an unusually long period and where recovery from the business depression has been a slow process. Particularly is this true in the Northwest. There country dealers are finding a revival of demand for cars such as has not been experienced for many months.

Proved Surprising Month

January proved one of the most surprising months in the production history of the industry with an output of 243,000 cars and trucks and established a new record. That figure not only was 151,891 larger than the total for January of last year but it exceeded the same month in 1920 by 75,000. It took rank with the four months of last year, in the late spring and summer, that went beyond the 240,000 mark. The increase over December approximated 17,000.

Carload shipments aggregated 33,900; driveaways, 31,400, and boat, 800, the latter alone showing a decline from December. Open weather made feasible the driving away of cars from factories by dealers. Improvement in the railroad situation is indicated by the greater extent to which manufacturers were able to make use of rail facilities in shipping their products. Carload shipments increased approximately 7000 over December.

During the past week there has been some delay in moving shipments due to weather conditions. Receipts of material by automobile producing plants likewise have been retarded for the same reason but this condition is only temporary.

Tire makers are following the general trend toward greater activities and have launched manufacturing schedules that will mount considerably

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Business in Brief

NEW YORK, Feb. 15—Marked progress was made during the past week in the wholesale and jobbing trade, while retail trade, in many instances, was retarded by the bad weather. Heavy snows and rains were of great advantage to the winter wheat crop and in paving the way for good crops in the cotton belt. Industry on the whole was increasingly active, and price movements were generally higher.

The demand for building materials increased greatly and prices were generally firmer. Steel showed greater activity due to the demand for building material, the purchases of automobile and implement manufacturers for first six months' production and the chaotic state of the continental iron and steel industry.

Coal production continued at a high level. Shipments for the week of Jan. 27 were in excess of the previous week. Soft coal prices eased slightly.

Car loadings for the week ending Jan. 27 totaled 871,164, an increase of 5586 cars over the previous week and far in excess of loadings for the same period a year ago.

Reports of industrial activity gave rise to speculation on industrial stocks, and the stock market reflected this in a turnover of stocks not experienced for a year. The retarding influence of the foreign situation was temporarily outweighed by optimism over domestic affairs. Bonds also gained, and European bonds came in for their share.

Bank clearings made a small gain, about 2.5 per cent. For the week of Feb. 8 they aggregated $7,205,235,000. This figure shows a marked increase over the same period one year ago.

Wire Wheel to Make Rudge-Whitworths

Marlin-Rockwell Corp. Will Devote Efforts to Ball Bearing Interests

PHILADELPHIA, Feb. 12—Announcement is made that the Wire Wheel Corp. of Buffalo has taken over all the interests of the Marlin-Rockwell group in the manufacture and servicing of Rudge-Whitworth wire wheels. Coupled with this is the statement that the Marlin Wheel Corp., a subsidiary of the Marlin-Rockwell Corp., which has been operating under license from the Wire Wheel Corp., manufacturing Rudge-Whitworth wire wheels, will be dissolved.

All manufacturing contracts as well as servicing of Rudge - Whitworth wheels will be continued by the Wire Wheel Corp. at the factory in Buffalo and through its many branch houses and service stations throughout the country.

Out of the wire wheel business, the Marlin-Rockwell group will expand and develop its ball bearings interests through its other subsidiary, Standard Steel & Bearings, Inc., which manufactures the S. R. B. bearings. That part of the Philadelphia plant which heretofore has been devoted to the wire wheel business will be taken over for the manufacture of bearings which previously had had only part of the plant.

Bearings Business Increases

In addition, the bearings end of the business will utilize the plant at Plainville. The rapid development of the bearings interests caused the company to give up the wire wheel and concentrate on bearings, it is said.

No change in the personnel of Standard Steel & Bearings, Inc., will result from this action. Guy W. Vaughan, who was president of both the Marlin Wire Wheel Corp. and Standard Steel & Bearings, Inc., will continue at the head of affairs.

The Marlin Wire Wheel Corp. was incorporated in February, 1922, as a Marlin-Rockwell subsidiary, the latter having taken over the Rudge-Whitworth wheel interests in 1917 from the Standard Roller Bearing Co., then in a receivership, which was originally licensed to make Rudge-Whitworths in 1912 by the Wire Wheel Corp., which controls the basic patents of the triple spoke wheel.

U.S. Chamber Votes Transport Study

Coordination Plans Take Definite Shape

Assistance Will Be Given by Automotive Industry and Railroad Executives

WASHINGTON, Feb. 12—Plans for the coordination of motor, rail and water transportation have now arrived at a definite stage. The directors of the Chamber of Commerce of the United States met in Washington last week and approved the proposal that immediate action be taken on a comprehensive study of the whole question of national transportation.

The automotive industry will have representatives to assist the Chamber in developing the investigation and study. The executive committee of the Association of Railway Executives has given assurances of its earnest cooperation in this broad and far-reaching inquiry.

All interested parties are hopeful that an agreement may be reached on a definite transportation policy covering the relation of the railroads to motor transport and inland waterways. This agreement to get quick action is undoubtedly inspired by the present legislative situation, which shows a distinct movement in Congress for radical government ownership of transportation systems.

To Combat Socialistic Trend

Many newcomers in the new Congress will have legislative proposals bordering on socialism. There is a well defined movement now under way for the nationalization of rail carriers, and other primary industries.

The Washington conference followed that called in New York for Jan. 27 by Julius H. Barnes, president of the Chamber, to consider ways and means of coordinating the transportation systems of the country.

The proposition was submitted to the board of directors of the Chamber Feb. 8, A. J. Brosseau, J. Walter Drake and others discussing the subject before an executive meeting of the board. It was decided that in order to avoid duplication a central body should be in charge of the inquiry. Sub-committees will be assigned to a study of the motor transport phase and their reports will be considered by the general committee. Undoubtedly, the recommendations of the general committee will form a background for legislative action in the future.

It may be observed in passing that there is no tendency on the part of the various classes of carriers to cooperate to such an extent that competition will disappear. Development of this character is practically impossible, and would be a direct play into the hands of the socialistic element bent upon government ownership of public utilities. No confederation is contemplated, as the cooperation is confined to a study of conditions.

The findings of the investigating committees also will exercise an influence over investments for motor, rail and water equipment. Officials of public utilities feel that capital invested in establishing a new railroad would be useless, if, in the end, it is to be superseded by motor transport or water competition. It is expected that the study will be sufficiently thorough to guide investors.

For instance, if it is the conclusion of the investigators that a motor transport system could be operated profitably and

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Improved Conditions in Mexico Make Country Good Field for the Sale of New American Automobiles

By W. E. Morrison,

Export Manager of the Paige-Detroit Motor Car Co. and Jewett Motors.

Detroit, Feb. 13.

THE Mexican market for American-built automobiles holds forth a great deal of promise, especially so with the gradually improving conditions under the Obregon administration, and the possibilities of an early recognition of this government by the United States and other important nations.

Practically all of the automobile business in Mexico now is being done by American manufacturers or dealers handling American makes of cars. The foreign car is an exception, though there are still a few of German, British and French manufacture in operation. The new car buying, however, is distinctly in American models.

The impression that there might be a market for used cars from the United States in Mexico is a mistaken one, as it is a characteristic of the country and for that matter all Latin-American countries, that the automobile is for dress occasions primarily. There is a used car problem in Mexico for that reason that is more difficult than in the United States.

With the dis-establishment of the old political conditions in that country there is a growing middle class of citizenship that is well-to-do and has wide buying influence, and they will form an important group in the future automobile market. There is considerable buying among them now in the middle and low-priced vehicles.

It is a noticeable feature of the business that the demand runs largely to special paint work and distinctive equipment and finishes. From the highest to the lowest buyer there is a demand for the bright-looking cars. Furthermore, the average Mexican likes to run his car with the cut out open and prefers a car without a muffler.

Owing to the fact that there are no existing treaties between the United States and Mexico there is always the possibility of confiscation of property, but this is a risk that American car manufacturers can well afford to take. The Obregon government has the situation well in hand and there is really less lawlessness there than in many American communities.

At the present moment there is a somewhat strained financial condition in the country owing to the organization of the new national banking system, and the transformation from the old methods to the new. This is only a temporary condition, however, and will be overcome quickly as soon as the new banks have opportunity to operate. Rates of exchange on Mexican currency are on a par with American along the border.

With the formal recognition of the government the country should become very prosperous owing to its great natural resources and the willingness of foreign capital to undertake its exploitation. There is no longer any bitterness toward the United States and this country will have every opportunity to share in the development.

The retail business in many lines in Mexico is in the hands of foreigners, and for the most part the automobile business is in the hands of Americans. Mexicans are gradually drifting into the business, but for at least several years to come American dealers will be in the majority.

R & V Strengthens Financial Position

Engine Deal with Yellow Sleeve Furnishes Additional Working Capital

EAST MOLINE, ILL., Feb. 10—H. A. Holder, president of the R & V Motor Co., in the first official statement to stockholders dealing with the recent negotiations with the Yellow Taxicab interests, sweeps aside any report that the entire plant had been sold to the Chicago group, and, in a detailed statement of the R & V finances, states that in the last two years the total indebtedness has been reduced approximately $4,500,000—from $6,500,000 to $2,000,000.

Two major phases of the deal—the financial and working agreements—are dealt with at length in the statement.

"The R & V Motor Co. has sold to the Yellow Sleeve Valve Engine Works, Inc., all machine tools in our factory for the production of engines, together with tools, patterns, drawings, etc., of our four-cylinder engine, for $350,000 cash," the statement says. Holder then states:

Option to Buy Given

In addition, it has sold to these interests all the work in progress in our machine shop, applicable to the manufacture of engines, at $185,000, for which credit is given it and which shall be applied against the purchase price of engines which the R & V may secure in the future.

We have also given an option to the Yellow Sleeve for the sale of the entire factory over a term of a three-year lease at a price up to $450,000. R & V retains all rights to patterns, dies, drawings, etc., of its six-cylinder engine and the control of its design with the right to make changes and improvements and retains a direct Knight license on the same terms and conditions as other passenger car manufacturers, having secured supplementary licenses to manufacture engines for commercial vehicles which will be assigned to and under which the Yellow Sleeve will operate.

Will Save on Overhead

By the working agreement, the R & V contracts with the Yellow for its engines on a basis of cost of material and labor, plus a fixed amount for overhead, dependent upon the quantity bought, plus a profit for the manufacturing concern. This contract extends over a period of three years and the R & V bonds itself to take at least 800 engines and the manufacturing company agrees to furnish any amount up to 4000 engines a year.

The floor space leased comprises about a third of the plant. Production of engines for both the R & V and the Chicago Bus Co. will reduce manufacturing cost by increasing purchasing power and reducing overhead charges per engine.

The Holder statement points out that the deal gives the R & V capital needed to enable it to carry on the manufacture of its recently developed six-cylinder car.

"It is very possible, should our business expand, as is hoped, that the financial assistance secured in this way would be equal to an investment of $1,250,000 by us, in addition to the amount secured by the purchase price," Holder informed the stockholders. "It places the company in a position to enable it to manufacture products up to a value of $5,000,000 a year."

Further financial aid is given the company by extension of notes of the motor company to the Root & VanDervoort Engineering Co. and in turn pledged by it for collateral on its bank loans which fall due Feb. 28, 1923, to Sept. 1, 1924. These amount to $1,134,000.

"In addition to this," the statement says, "the R & V Motor Company will be able to pay all its liabilities in full with the exception of the $1,134,000 owing to the Root & VanDervoort Engineering Co. and by the latter pledged to the banks, together with all securities owned by the Root & VanDervoort Engineering Co. for its bank loans of $1,897,269 which will then be the total indebtedness of all companies. In consideration of the action by the banks, the R & V Motor Co. will execute a mortgage on the land and buildings which are retained as partial security for its indebtedness to the Root & VanDervoort Engineering Co., which will be added to the collateral pledged for the engineering company's notes."

The statement is addressed to stockholders of the R & V Motor Co., Root and VanDervoort Engineering Co., and the Root & VanDervoort Corp.

NASH WILL CONSTRUCT FIELD FOR EMPLOYEES

KENOSHA, WIS., Feb. 12—Further extension of welfare work among employees has resulted in the decision of the Nash Motors Co. to provide a complete athletic field at a cost of more than $85,000.

Contracts have been let for the construction of a steel and concrete grandstand and bleachers and preparation of a model field with baseball diamond, football field and other facilities.

The Nash company also is organizing a "semi-pro" baseball team which will be given a schedule, taking it into all parts of the United States. In addition teams will be organized among the employees, man as well as women, for organized participation in various sports among themselves.

PREPARING OFFICE BUILDING

EAST MOLINE, ILL., Feb. 9—The Kirkwood Hotel, erected by the Root & Van Dervoort Engineering Co. during the war-boom to house employees unable to find lodgings because of the home shortage, is to be remodeled into administration and office building for the R & V Motor Co.

Waltham Watch Plan Will Be Carried Out

Common and Preferred Stock Totaling 103,326 Shares Voted in Favor of It

BOSTON, Feb. 10—Following the dismissal of the suit of a stockholder against the Waltham Watch Co.'s reorganization committee in the United States District Court, the plans for bringing about the aims of the majority stockholders were approved at the factory yesterday. A total of 103,326 shares of both common and preferred were voted in favor and 699 against the reorganization, recording almost a unanimous favorable sentiment.

Under the proposed plan Frederic C. Dumaine, assisted by a new board of directors and with the financial cooperation of Kidder, Peabody & Co., will manage the business. More than $7,000,000 will be provided to pay the coupon notes and bank loans and to raise part of the cash required; $1,700,000 worth of 7 per cent prior preference stock will be offered for subscription at par by present stockholders.

New Bond Issue Planned

In addition to this stock, the new corporation plans to issue $3,000,000 worth of first mortgage twenty year 6 per cent bonds; a similar amount of five year 7 per cent debentures; $5,000,000 6 per cent preferred stock; 25,000 shares of Class A and 70,000 shares of Class B common stock of no par value.

Kidder, Peabody & Co., as syndicate managers, are to purchase the $6,000,000 worth of bonds and debentures, 10,000 shares of the preferred and 7000 shares of the Class B common stock, paying $5,300,000 cash, and agree to underwrite the prior preference stock, making the total commitment $7,000,000. Also they are to purchase 25,000 Class A common for $250,000.

F. S. Mosely & Co. are with Kidder, Peabody & Co. in the syndicate. The syndicate contract provides for the purchase of prior preference stock not taken by present stockholders, the syndicate to receive for each $20 or $10 paid by it the similar face value in this stock, and 55/100 of a share of the new preferred or 65/100 of a share of the new common stock.

Officers Elected

The syndicate will receive no underwriting compensation other than the securities it buys under this agreement. A permanent board of directors has not been elected yet, but F. C. Dumaine has been made president, Harry L. Brown, assistant treasurer, and I. E. Boucher, manager. The latter was identified with the Amoskeag Manufacturing Co. for twenty-one years. Lately he has been associated with Jarvis, Loomis & Boucher, selling agents.

Du Pont de Nemours Shows G.M. Holdings

Is Owner of 7,623,345 Shares of Common Stock of a Value of $105,000,000

WILMINGTON, DEL., Feb. 12—The annual report of E. I. duPont de Nemours & Co. discloses for the first time the extent of the company's General Motors holdings. The statement announces a total of 7,623,345 shares of General Motors Corp. common stock which, based on current quotations, have a market value of about $105,000,000.

The duPonts estimate that their equity in the undistributed earnings of their interest in General Motors amounts to $13,150,000. They have received $3,756,088 as their portion of the 50 cent per share dividend declared by the corporation last fall, a total of $16,906,000 earnings on the stock they own in General Motors.

That portion of the report referring to General Motors reads as follows:

"During the year 1922 your company received $3,756,088 as its portion of a dividend of 50 cents per share, declared by the General Motors Corp. This represents 4.7 per cent on the total cost of your holdings.

"The preliminary statement of General Motors Corp., which was made public in November, 1922, estimates that the earnings accruing to the common stock will be upwards of $2.25 per share for the year 1922, so that there has accrued to the benefit of your company as a common stockholder approximately $13,150,000 over and above the dividend, making total earnings of $16,906,000, or 21 per cent on your investment.

"It is interesting to note that your company now owns, directly and indirectly, an aggregate total of 7,623,345 shares of General Motors Corp. common stock. Of this, 513,516 shares are owned by the parent company and 6,998,660 shares by Du Pont American Industries, Inc., while the remaining 111,169 shares represent your company's equity in General Motors Corp. common stock held by Chevrolet Motor Co. and Canadian Explosives, Ltd.

"Your company has outstanding 950,609 shares of its own common stock. Thus it will be seen that its direct and indirect holdings of, and equity in, General Motors Corp. common stock amounts to approximately eight shares for each share of Du Pont common stock."

Spring Manufacturers Form Holding Company

NEW YORK, Feb. 12.—The Associated Spring Corp. has been organized under New York laws, taking in the Wallace Barnes Co. of Bristol, Conn.; William D. Gibson Co. of Chicago, the Raymond Manufacturing Co. of Corry, Pa., Barnes-Gibson-Raymond, Inc., of Detroit, and the Wallace Barnes Co., Ltd., of Hamilton, Ont.

The new arrangement contemplates no change in either the management or the personnel of any of the organizations involved. Each business will operate as heretofore.

The Associated Spring Corp. is in the nature of a holding company and it is felt that by uniting their interests in this manner each unit will profit thereby through having five plants so arranged geographically as to cover practically the entire manufacturing field of the United States and Canada.

The Barnes - Gibson - Raymond plant was recently established in Detroit, while in addition to manufacturing springs the Wallace Barnes Co. operates a cold rolling mill at Bristol, thus giving to all units the advantage of a metal source of supply under their own direction.

HORSE-DRAWN VEHICLE DECLINES IN 7 YEARS

WASHINGTON, Feb. 11—As an indication of the passing of horse-drawn vehicles the statistics compiled by the Bureau of the Census on the manufacture of carriages and wagons and materials for 1921 show a decrease of 64.1 per cent in the value of products from 1919-1921.

It also shows a slump of 67.8 per cent for the seven year period 1914 to 1921.

The total value of these products in 1921 was $42,418,000, as compared with $118,228,000 in 1919, and $131,547,000 in 1914.

In addition, establishments engaged primarily in other lines of manufacture reported the production of carriages and wagons and materials, valued at $2,741,000 in 1921; $13,921,000 in 1919; and $4,493,000 in 1914.

Continental Car Opens Indianapolis Division

INDIANAPOLIS, Feb. 12—The Continental Car Co. of Louisville, Ky., maker of commercial bodies, has established a sales division in Indianapolis, which is to be known as the Continental Body Co.

E. J. Herrmann, for the past fourteen years associated with the Parry interests as western sales manager, has been placed in charge, his headquarters being in the National City Bank Building.

Associated with Herrmann are twelve of the former Parry distributors, located in the principal centers of the country, who will service and distribute Continental bodies exclusively through dealers in their respective territories.

TIMKEN-DETROIT ELECTS

DETROIT, Feb. 12.—Officers of the Timken-Detroit Axle Co., for the current year have been elected as follows: H. W. Alden, chairman of the board; Fred Glover, president; C. W. Dickerson, vice-president and secretary; C. G. Rowlette, vice-president and treasurer; Don Devor, vice-president in charge of manufacturing; F. W. Hood, vice-president in charge of sales; Haldeman Finnie, assistant secretary, and W. C. Wood, asst. treasurer.

Spring Lake Chosen for S. A. E. Meeting

June 19 to 23 Selected for Summer Session—Annual Convention in Detroit

NEW YORK, Feb. 12—Spring Lake, N. J., has been selected for the summer meeting of the Society of Automotive Engineers, June 19 to 23. Last year the session was held at Hot Springs, Va. The society also has decided to hold its annual meeting in Detroit in January instead of in New York City during the national automobile show, as has been the case in the past.

Spring Lake is a well-known summer resort near Asbury Park and about sixty miles from New York City. It has two hotels, the Essex and Sussex and the Monmouth, which are declared to be adequate for housing the convention and meetings of the society. The sport features of the meeting also will be well cared for, there being two eighteen hole golf courses, tennis courts, baseball fields and swimming pools at the resort.

The society has selected Detroit for its annual meeting because of the great number of counter attractions in New York while the show is on. By going to Detroit, it is believed that the engineers will be able to devote all their attention to the society's activities.

The S. A. E. also announces a meeting in Cleveland April 26-28, which will be devoted to automotive transportation. This meeting will include sessions on operation and maintenance of motor trucks, motor buses, taxicabs and motor rail cars.

The production meeting of the society will be held in Cleveland the latter part of October. It will follow the plan so successful in Detroit last year, technical meetings being devoted to factory methods and production problems.

The date of the Pennsylvania section meeting on lubrication has been changed to Feb. 20, and A. Ludlow Clayden will address the meeting instead of Robert E. Wilson.

Claims Likely to Defer Sale of Republic Truck

DETROIT, Feb. 12—Sale of the Republic Motor Truck Co. by the receiver will probably be deferred until April, pending a determination by the Federal Court on the priority of claims presented by persons at interest. In the meanwhile the receiver will operate the plant on a gradually expanding sales basis. Sales in February will exceed 100, the receiver declares, and orders for 125 for March delivery have been received already, according to his statement.

Three or four factions are represented among the possible purchasers of the property, the receiver says, and there is a likelihood that bids will be entered from each of these sources.

Goodyear Earnings Totaled $10,938,747

Sales by Company for Year Ended December 31 Reported as Being $102,904,117

AKRON, Feb. 12—The Goodyear Tire & Rubber Co., in its annual statement issued today, reports sales of $102,904,117 for the fiscal year ending Dec. 31, and net earnings for the same period of $10,938,747. The sales represent an increase of more than $8,500,000 over sales for 1921, which were $94,328,803. After deduction of interest and other charges the company reports a net balance to surplus of $4,388,499, the addition of which to the surplus previously reported gives the company a total surplus, as of Dec. 31, 1922, of $8,008,542.

President E. G. Wilmer in his annual report announces that the ratio of current assets to current liabilities is almost 12 to 1. In the supplemental report coincidentally issued, Wilmer reports the following facts concerning the recovery from the burden of refinancing.

By March 15 the company will have retired $4,750,000 in bonds and debentures. The company has retired $3,195,500 of par value preferred prior preference stock held in escrow; and $9,902,500 par value of prior preference stock of the $29,902,500 issue, leaving only $20,000,000 of such stock outstanding; has arranged for the purchase and retirement before Feb. 1, 1924, of an additional $5,000,000 par value of prior preference stock; has arranged for the surrender and cancellation of 50,000 shares of common stock.

By reason of the purchase of the prior preference stock already retired at a price less than par, and the cancellation of accrued dividends thereon Jan. 1, 1923, the equities of preferred and common stocks have been increased by $3,010,360, the company reports. Upon the retirement of the additional $5,000,000 of prior preference stock on Feb. 1, 1924, the equities of preferred and common stocks should be increased by an additional $1,270,000.

The Goodyear balance sheet shows the following assets and liabilities:

ASSETS

Property accounts less depreciation	$44,478,439
Sumatra rubber plantation	6,332,610
Equipment, fixtures, etc.	953,557
Investments in subsidiaries, etc.	31,888,802
Current assets, inventories, etc.	30,586,736
Receivables	12 062,902
Securities, etc.	11,197,319
Cash in banks	10,334,180
Other assets, including one-half interest in A. C. and Y. RR.	12,500,000
Deferred charges	6,176,779
Total assets	$168,802,006

LIABILITIES

Capital common, preferred and management stock	$95,992,100
Funded debt	$55,250,000
Current liabilities, including accounts payable, accrued interest and premiums on bonds, etc.	
Reserves	4,139,881
Surplus	8,008,542
Total liabilities	$168.802,006

Out of the net sales of $102,904,177, deduction for manufacturing cost is made of $82,114,366.

The profits of the California company are itemized at $837,317.

LaFayette at Milwaukee; Organization Completed

MILWAUKEE, Feb. 12—The transfer of the works of the LaFayette Motors Corp. from Mars Hill, Indianapolis, to Milwaukee, has been completed, and the general organization perfected.

Charles W. Nash, president, will retain his headquarters in Kenosha, Wis., the seat of the Nash Six and Nash truck works, being represented in the LaFayette company by Earle C. Howard, vice-president and secretary, and David F. Edwards, vice-president and treasurer.

Edwards will supervise tthe operation of the works, with C. D. Selheimer as factory manager; J. E. Auten, purchasing agent; H. D. Snyder, assistant treasurer, in charge of accounting, and L. E. Menges, engineer.

Howard will have charge of sales and advertising, with D. B. Skinner as advertising manager and C. R. Hood as technical and service manager. The new factory 200 x 950 ft. is employing 400 men and plans a production of fifteen cars a day, or 4500 cars a year. Seventy-six foremen of the old plant and many assistants and other skilled workmen have been brought from Indianapolis to Milwaukee.

Plan for New Syra-Cord Now Declared Operative

SYRACUSE, Feb. 13—The plan for the reorganization of the Syracuse Rubber Co. as the Syra-Cord Tire & Rubber Co. has been declared operative, inasmuch as the financing of the new concern has been completed.

The plan was devised to prevent a forced sale of the assets of the old concern and resultant losses to the stockholders. The stockholders' committee is now enabled to buy the assets of the plant at a public auction here decreed by the Federal Court.

Approximately 1400 persons have subscribed to stock in the new corporation, sales being based on proportion to their holdings in the defunct company.

A voting trust to have charge of the affairs of the company for five years has been established, consisting of Walter R. Stone, C. E. De Long and Albert J. Will. The stockholders' protective committee includes De Long, chairman; Will, Mary A. Powers, George A. Langan and Frank C. Love.

As soon as all formalities have been completed, the new corporation will begin production on an extended scale.

Compromise Reached in Goodyear Suits

Leonard-Kennedy Co. Contract Remains in Force Minus Bonus Provision

AKRON, Feb. 10—Six court actions brought by stockholders of the Goodyear Tire & Rubber Co. against the present Goodyear management and banking syndicates which handled the Goodyear refinancing program of $85,000,000 in May, 1921, in which the legality of the refinancing and reorganization program was attacked, were compromised and withdrawn from the Common Pleas Court here this morning. Judge W. J. Ahern signed journal entries today dismissing the actions and making certain findings in compliance with the compromise agreement reached in the cases.

Under the agreement John Sherwin of Cleveland, Owen Young and Clarence Dillon of New York remain trustees of 10,000 shares of management stock; and this stock remains in virtual control of Goodyear affairs, having power to elect a majority of directors. The three trustees, however, waive further payments to them of $10,000 a year each as salary, plus a $10,000 annual expense fund for all three.

Further Bonus Waived

The Leonard Kennedy Co. contract, entered into by Goodyear for the supplying of the new Goodyear president and treasurer, remains in force, Goodyear continuing the payment to the Kennedy company of $250,000 annually out of which it pays E. G. Wilmer $50,000 a year salary as Goodyear president, and P. H. Hart $15,000 a year as treasurer. Further payments of any bonus to the Kennedy company of a percentage of Goodyear profits are waived by the Kennedy company.

The court decree gives Goodyear the right to retire before Feb. 1, 1924, $5,000,000 worth of prior preference stock at $90.60 a share. The court also orders Goodyear within thirty days to retire 50,000 shares of common stock.

Under the refinancing agreement the prior preference stock would have been redeemable at $110 a share plus dividends, were it not for the court order permitting retirement of $5,000,000 at $90.60 a share.

Stockholders Satisfied

Attorneys for the complaining stockholders said today they were satisfied with the compromise reached and claimed that for the twenty year period over which the refinancing extends, the agreements reached will mean a saving to Goodyear stockholders of more than $15,000,000.

In connection with the court decrees signed today by Judge Ahern, all parties in the pending suits join in the following official statement:

(*Continued on page* 354)

Liberty's Current Assets Are $97,906

Receiver's Statement Puts Notes and Accounts Receivable at $78,879

DETROIT, Feb. 12—The financial statement of the Liberty Motor Car Co. prepared by the Security Trust Co., receiver, shows an excess of assets over liabilities of $72,272 exclusive of capital. Assets total $1,673,535 and liabilities $1,601,262.

Current assets total $97,906 and include cash, $11,019; notes receivable, $6,346; accounts receivable, $72,533, and cash surrender value of life insurance policies, $8,006.

Merchandise inventories total $625,929, fixed assets, $930,082, and deferred charges, $19,616.

No experimental and development costs, dealers' organization expense or good will have been included in the above.

The liabilities show secured indebtedness at $435,311 and includes $300,000 in first mortgage 7 per cent gold notes due Jan. 3, 1923, and accrued interest thereon of $8,750. It also includes land contract of $119,012 with accrued interest of $7,549. Payments on the land contract for principal and interest due on and from Jan. 1, 1922, including three payments of $10,819 each, are in arrears.

Preferred liabilities including accrued payrolls and taxes total $36,085. Unsecured current liabilities total $1,129,865 and include current accounts payable subsequent to Jan. 3, 1922, $169,833; dealers deposits and miscellaneous liabilities, $27,399; extension agreement notes payable due Jan. 3, 1923, banks, $561,930; merchandise creditors, $305,625, and accrued interest thereon, $65,077.93. Under agreement dated Jan. 3, 1922, these notes were made secondary and subordinate to liabilities incurred subsequent to that date.

February 21, Last Day for Filing Elgin Bids

CHICAGO, Feb. 12—Bids for the property of the Elgin Motor Car Corp. at Argo, a suburb of Chicago, will be received in writing by Fred E. Hummel, trustee, until 4 p.m. Feb. 21, and will be reported at 10 a.m. Feb. 23, to Frank L. Wean, referee in bankruptcy. The trustee, under the terms of the court order, reserves the right to reject any or all bids.

Bids will be received for the property either in parcels or in its entirety, and the bid or combination of bids which aggregate the highest sum will be accepted if and when the property is sold.

According to the trustee's statement, the property includes sixteen acres of land, eight buildings with an aggregate of 209,183 sq. ft. of floor space, machinery and office equipment, a large inventory of automobile parts, a few partially constructed Elgin cars and ten used cars. The land and buildings are said to be subject to mortgage liens approximating $140,000. The good-will of the company, its trade name, trade marks, patents, notes and bills and accounts receivable also are to be included in the sale.

The order of sale recites that the Elgin car was exhibited at the recent New York and Chicago National Automobile Shows and that the purchaser would find the property well adapted to the continued manufacture of the Elgin car.

ANOTHER PRODUCTION RECORD ESTABLISHED BY INDUSTRY IN JANUARY WITH 243,000 CARS AND TRUCKS

NEW YORK, Feb. 12—Figures compiled by the National Automobile Chamber of Commerce place January production of cars and trucks at 243,000 in contrast to 91,109 in January, 1922, a gain of 168 per cent, and to 226,556 in December of that year, an increase of 8 per cent. The best previous January was in 1920 with an output of approximately 168,000.

Ford production in January of this year is estimated at 111,145.

The following table gives the statistics for January and for the months of 1921 and 1922:

	Output	Carloads			Driveaways			Boat		
	1923	1921	1922	1923	1921	1922	1923	1921	1922	1923
January	243,000	6,485	15,357	33,900	3,185	7,479	31,400	93	143	800

Factory shipments for the other months of 1921 and 1922 and output for 1922 follow:

	Output	Carloads		Driveaways		Boat	
	1922	1921	1922	1921	1922	1921	1922
February	122,366	9,986	19,636	7,507	10,173	99	180
March	172,720	16,287	27,753	9,939	16,917	75	560
April	219,558	20,187	31,334	14,197	22,381	1,619	2,960
May	256,219	18,608	33,416	15,193	28,827	2,381	7,406
June	289,011	20,269	34,230	18,834	33,857	3,947	7,737
July	245,414	19,514	29,116	15,533	28,100	3,726	7,030
August	273,425	20,758	32,814	15,218	36,754	3,595	10,096
September	205,784	19,002	25,950	13,840	30,055	2,959	8,002
October	238,514	17,808	26,980	12,971	33,320	2,226	7,040
November	235,854	14,264	27,232	10,528	27,376	1,402	5,070
December	226,556	12,100	26,900	7,500	27,500	134	1,300

Production in January Reached 243,000 Total

(*Continued from page* 344)

higher than those followed in the peak production months of 1920. They see an exceptional demand coming in the spring and are bending all efforts to meet it. Reserve stocks of finished tires have been augmented considerably in recent weeks and will be further increased by the new programs.

Business of parts makers continues at a high level and the quarter should be materially larger than a year ago. In the last week, car and truck manufacturers have increased their releases of parts orders. Collections continue to be good.

Improvement is noted in truck manufacturing centers, although it has not been as marked as in the car producing field. There has been a wholesome gain in demand, however, which is regarded as entirely satisfactory.

Rubber Commission Returns to England

NEW YORK, Feb. 12.—Sir Stanley Bois, Erie Miller and P. W. Litchfield, the committee representing the Rubber Growers' Association of London, which has been in this country for the past month conferring with a committee from the Rubber Association of America on the British restriction act, sailed for home on the Olympic Saturday. Contrary to expectations, no statement regarding the various conferences was issued.

Nothing will be known as to the outcome of the conference until Sir Stanley and his colleagues present their recommendations to the Rubber Growers' Association and the latter has acted on the report.

It is likely that H. Stuart Hotchkiss, chairman of the Rubber Association of America's committee, will be called upon, if necessary, to furnish any additional data that may be required to solve the big problem. Hotchkiss, who is vice-president of the United States Rubber Co., is crossing on the Olympic with the English committee, being called abroad on private business, and he will hold himself ready for any calls on his time that the producers may desire.

RICHELIEU STATEMENT

NEW YORK, Feb. 12—A statement of assets and liabilities has been filed in court by the Richelieu Motor Car Corp. of this city, showing liabilities of $46,851 and assets of $2,723. The principal creditors are the United Body Corp., Edward P. Decker, N. G. Rost and N. Van Zandt.

1923 Models of Cars Reach South Africa

Good Year Expected by Trade—Motor Buses Show Advance in Popularity

JOHANNESBURG, SOUTH AFRICA, Jan. 15 (By mail)—Automobile dealers never look for much business during the Christmas month in South Africa. For although the country is then in midsummer, there is a general holiday feeling and the public are not as yet educated up to an "automotive" Christmas where presents are bought for the car.

However, the South African motorist generally tours somewhere during December, and about January and February the service stations and garages begin to feel the effects of the increased mileage. Despite the predictions that last December would be slow, it proved rather an exception to the rule, and something above the usual volume of new car sales were made.

"Dumping" Hurt Accessories

A number of garages in Cape Town, Durban and Johannesburg are either closing down their accessory departments, or going in for this side of the business on a large scale. The accessory and parts business has been very difficult lately because of the large stocks thrown on the market as a result of the "dumping" of a couple of years ago.

The position is now much easier, and importing is going on on quite a considerable scale. The air for 1923 has cleared considerably both as regards accessories and cars. There are now very few cars in bond and practically every firm has started to import once more.

Some of the latest 1923 car arrivals are the Oakland, the special model Buick, the Lexington, the Cadillac, the Oldsmobile, the Dodge Brothers, the Maxwell and a few British makes.

Arthur Williams and R. Poe of the General Motors Export Co., South Africa, have just completed a demonstration tour through the four provinces of the Union with a phaeton and sport model Oakland, and it is understood that a number of dealers have been appointed, and that the Oakland will soon be on its way toward recovering the position it held some three years ago.

Steady Improvement Expected

Dealers look forward to steady improvement during 1923. Last year was the worst business year in their experience. It started off with a three month's mining strike that culminated in the Red Revolution that effectively put "the tin hat" on everything for the rest of the year. The pickup lately, however, has been noticeable, although slow, and everyone seems to think the country is in for a better year.

Generally business throughout South Africa is still bad, but it is understood that new mines may open shortly, and others increase their present operations. Labor troubles appear to have been settled for many years to come, and the country is likely to attract more capital by reason of these better conditions.

Last year was a truck year in South Africa. The motor truck and commercial vehicle came into its own, and the user of transport is now changing over from animal-drawn vehicles. This year will be a bus year. Development in this regard has been extremely rapid lately. In nearly all the larger towns buses are now being operated, and, in many cases, in opposition to street cars and trackless trolley cars. Long distance routes are being planned for early this year, the first inter-urban service to start being from Johannesburg, the chief and largest city of the Union, to Pretoria, the administrative capital, a distance of 36 miles.

Bodies Built Locally

White buses, with locally built bodies, are to be used, and have already arrived for use by the United African Transports, as the company has been called. This company, it is understood, will operate a number of interurban lines along the Reef to service the various mining towns.

Motor buses have made a difference in the street-car receipts in Johannesburg. It is possible that a fight will be made on the bus companies this year, and, it is said, that tenders have been called for the supply of twenty motor buses. These may be used only as feeders to the street cars, but it is thought that they also might be operated in opposition to privately owned buses on at least one section.

The campaign against the high price of fuel continues to be supported by a large section of the South African press. The Government is earnestly investigating the possibilities of locally produced fuel from shale, coal and alcohol. Cheaper fuel would mean an immense difference in the number of cars required in this country.

M. EDWARD.

Detroit Motor Castings Takes on New Executives

DETROIT, Feb. 12.—The personnel of the Detroit Motor Castings Co. has been reorganized with the introduction of two new officers and a new director. The new men are L. O. Haskins, treasurer and general manager; J. B. McWilliams, second vice-president and D. C. Stevenson, director. There is no change in capitalization, and, except for minor changes in policy, the company will continue as before.

The purpose of the reorganization is to divide responsibilities so that older members of the company may have more opportunity for other business interests.

J. C. Danziger continues as president; F. R. Skinner, vice-president; H. Streetor, secretary and Edward Roney, director. Transfer of stock to the new executives has been completed. No new stock will be issued as there is no refinancing involved in the reorganization.

Birmingham Dealers Set Up New Records

Many Improvements Being Made in District Point to Good Automotive Year

BIRMINGHAM, ALA., Feb. 14—Many good reasons and all reasoning point to Birmingham as a good market for automobiles during the next six months and possibly all the year. In addition to this, many dealers in Birmingham have set up new records during the month of January. That month is usually the second lightest of the year, February being the worst.

The first and one of the foremost reasons for Birmingham showing a steady increase in the purchase of automobiles is the wonderful improvement in the roads leading out of the city, and the fact that during the next year $1,000,000 will be spent on Jefferson County roads (Birmingham's country).

Every industry in Birmingham and the Birmingham district, as well as the industries of north Alabama, are working full force. This includes the iron and steel plants, the coal and ore mines, the textile mills and the many smaller industries through north Alabama.

New Industries Enter District

It is estimated that over $25,000,000 will be spent in Birmingham and the immediate surrounding territory on new industries and new additions to old industries during the year of 1923. Many of these plants were started during 1922.

Two large cement plants, to be constructed at a cost of $5,000,000 (estimated); the expenditure of more than $1,000,000 by the Alabama Power Co. in forming a power loop around Birmingham, to furnish 350,000 horsepower, said to be the largest in the country; the construction of a large bar steel mill by the Fairfield Iron Co. at Fairfield, Ala., a subsidiary of the United States Steel Corp.; additions to several of Birmingham's cast iron pipe works; the construction of a large by-products plant by the Empire Coal Co. in Walker County, and a number of other industries come into the total of $25,000,000 estimated to be spent during the year 1923 on new industries.

More Money in Banks

Added to this is the statement recently made by one of the leading bankers of Birmingham that the laboring class in this district are saving more money now than in any year since 1917. When the people employed in the industries around Birmingham are making and saving money all merchandising takes on a better tone, and bills are paid more promptly by all classes.

On the whole, the outlook for sales of automobiles in Birmingham and the territory served by Birmingham appears to be the best in many years.

Men of the Industry and What They Are Doing

Leave for Rome Conference

J. Walter Drake of the Hupp Motor Car Corp., A. J. Brosseau of Mack Trucks, Inc., and Howard E. Coffin of the Hudson Motor Car Co., representing the National Automobile Chamber of Commerce, and Hal H. Smith, president of the Hayes Manufacturing Co. of Detroit, representing the Motor and Accessory Manufacturers Association, have sailed on the Caronia for Rome to attend the International Chamber of Commerce convention, which will be held in that city March 19-26. Brosseau is a director of the Chamber of Commerce of the United States.

Sail for Europe

Sailing from New York on the Olympic last week were Charles M. Schwab and Eugene V. R. Thayer, controlling stockholders of the Stutz Motor Car Co.; H. Stuart Hotchkiss, vice-president of the United States Rubber Co.; F. C. Hood of the Hood Rubber Products, Inc., and Austin S. Murray, treasurer of the General Motors Export Co.

Durant Resting in Florida

W. C. Durant, accompanied by Mrs. Durant, has gone to Florida for a two weeks' rest, following which they will visit California. In all they will be gone six weeks.

Ryerson Succeeds Carr

Clyde M. Carr has retired as president of Joseph T. Ryerson & Son, Chicago, due to ill health, but will continue as a director. Joseph T. Ryerson, grandson of the original Joseph T. Ryerson, succeeds to the presidency. Ryerson was first identified with the American Sheet Steel Co., now the American Sheet & Tin Plate Co., at its mill in Vandegrift, Pa., and became associated with Joseph T. Ryerson & Son in 1902. Two years later he was elected treasurer and became vice-president in 1911. Carr served as president since 1911.

R & V Promotes Kelly

Roy C. Kelly, associated with the Root & Van Dervoort Engineering Co. since 1914 when he was assistant chief engineer and designer, has been appointed general manager of the R & V Motor Co. plant. At the time of the negotiations with the Chicago Motor Bus Co. interests Kelly was chief engineer and had been identified in designing the R & V cars.

J. H. Alfred Goes to Portland

J. H. Alfred, who has been identified with the Willys-Overland Co. at Toledo for some years, has gone to Portland, Ore., to succeed Frank C. Riggs as manager of the Portland branch of the Willys-Overland Pacific Co. Riggs, who has been in the automobile business on the Coast since 1909 and with Willys-Overland since 1916, has resigned to take a vacation of several months and then go into private business. For a number of years Alfred served as traveling auditor for the Willys-Overland company and in that capacity frequently visited Portland. Later he became assistant comptroller and more recently assistant to the sales manager.

Jewett Treasurer for Dunlop

Carlton C. Jewett has been appointed treasurer of the Dunlop Tire & Rubber Corp. of America. He will have complete charge of accounting and finances at the plant in Buffalo.

Trumble Returns to Olds

J. T. Trumble has been appointed experimental engineer of the Olds Motor Works. Originally Trumble was an Oldsmobile man, dating back to 1899 when the company made stationary gasoline engines. Following that he was a dealer, then joined Buick and in 1909 affiliated himself with Jackson. Of late years he has been with Chevrolet, Stevens and Samson tractor. His last connection prior to returning to Olds was with the Forsythe Wheel Co.

Nehrbas on Weidely Board

Fred P. Nehrbas has been elected vice-president and director of the Weidely Motors Co. of Indianapolis. He has been with the company for several years as works manager.

Berry with Detroit Drill

L. K. Berry, for sixteen years with the Warner & Swasey Co. of Cleveland, has resigned as domestic sales manager to become manager of sales of the Detroit Twist Drill Co. of Detroit.

Poag on Buick Sales Staff

Emerson J. Poag, formerly manager of the marketing research department of the Campbell-Ewald Co., has been appointed to the sales staff of the Buick Motor Co. Poag has been identified with the industry since 1910, and has served in the engineering, sales and advertising divisions.

Dr. Schuette Returns Home

Dr. Johann Schuette, head of the Schuette-Lanz Airship Co. of Germany, has sailed for home after an investigation of American progress in airship construction. He has been retained in an advisory and engineering capacity by the General Airship Corp., an American company which plans an airship line between Chicago and New York. These ships will be built in this country.

Lynch Heads Harrisburg Pipe

Christian W. Lynch has been elected president and director of the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., to fill the vacancy caused by the resignation of Alfred K. Barker. Up to the last year Lynch was president and general manager of the Harrisburg Foundry & Machine Co., and prior to that served for many years as president and general manager of the W. O. Hickock Manufacturing Co., also of Harrisburg.

Chapman with Robinson Company

Floyd M. Chapman has become affiliated with Dwight P. Robinson & Co., Inc., as consulting materials engineer. Chapman, who has been active in the work of the American Society of Testing Materials and the American Concrete Institute, will represent Robinson with these organizations.

Laycock Expands Representation

Arthur M. Laycock, 110 West Forty-second Street, New York, has been appointed representative of equipment spring service for the Detroit Steel Products Co., Detroit. For eleven years Laycock served as chief engineer for Sheldon Axle & Spring Co. During the war he acted as consulting engineer of the Fifth Avenue Coach Co. in the absence of Col. Green.

White Heads Toledo Steel Sales

F. H. White, for the past three years connected with the sales department of the Toledo Steel Products Co., has been appointed general sales manager of the company. His previous connection was with the Willys-Overland Co.

Craig Manages Kellogg

John Craig has been appointed manager of the Kellogg Manufacturing Co. of Rochester, N. Y., maker of engine driven tire pumps and automotive equipment. His headquarters will be in the Monadnock Building, Rochester.

Fenn Addresses Yale Students

F. W. Fenn, head of the motor truck division of the National Automobile Chamber of Commerce, addressed the class in engineering at Yale on Wednesday night, on "Motor Transport and Motor Buses."

Iseminger Joins Winton

Dan W. Iseminger has joined the sales department of the Winton Co. under the direction of C. Roy Clough, sales manager, and for the present will confine his efforts to special sales work. Iseminger comes to Winton from the Columbia Motor Co. of Detroit, and previous to that connection, was identified with the Lincoln Motor Co. as a factory representative.

Dr. Rosenhain Here on Lecture Mission

Will Address Colleges and Associations and Visit Industrial Centers

NEW YORK, Feb. 14—Dr. Walter Rosenhain, world renowned metallurgist of the National Physical Testing Laboratory, Teddington, England, and one of the most eminent authorities on aluminum alloys, is in America for two months, during which he is scheduled to give a series of lectures before colleges and engineering associations.

There will be four special lectures, the first a theoretical one, delivered before mining engineers, on metals, to be followed by one on the Constitution of Structural Alloys, another on Strain and Fracture in Metals and a fourth on Hardness and Hardening Processes.

Will Visit Ford Plant

In addition to visiting many technical schools and universities he will spend several days in a number of industrial centers, including Detroit, Cleveland, Dayton, Philadelphia, Pittsburgh, Springfield, Mass., and Waterbury, Conn. Part of his time in Detroit will be spent with the Ford organization. In Dayton he will speak at the Dayton Engineers Club.

Dr. Rosenhain, whose name is familiar to all readers of AUTOMOTIVE INDUSTRIES, through his contributions in its columns covering several years, gained special distinction during the war because of his research work in aluminum alloys, particularly duralumin for use in airships. During that period he had charge of the production of gages for the British metal industry and was instrumental in effecting very close cooperation between the work in the laboratory and different industries.

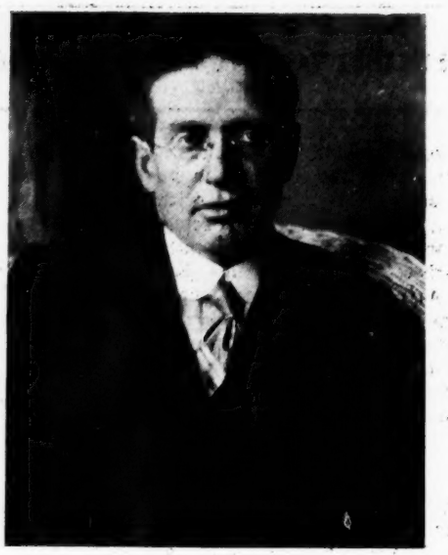
Dr. Rosenhain looks for a very considerable increase in the use of alloys of aluminum, not only in the automotive field, but in other metal industries. Besides aluminum alloys being already extensively used in pistons the use of forged aluminum connecting rods is on the increase. The use of cast aluminum for wheels offers another field of good development.

Studied Airplane Material

He does not look with favor upon the use of thin rolled aluminum as a covering material for airplane wings because it tears easily. During the war, Dr. Rosenhain installed in the National Physical Testing Laboratory a small commercial plant for rolling aluminum, which provided facilities for a broad research in the use of thin sheets.

The present drift away from dirigible development is regretted by Dr. Rosenhain, who believes that the dirigible can easily be developed to give an average speed of 100 m.p.h. which will bring it into the realm of commercial success. He considers the dirigible immeasurably in advance of the airplane as a sound business development in commercial aviation. The doctor believes that helium is not a prime essential to safety, but that other fields of gas development offer feasible solutions of the fire danger.

During his visit in this country Dr. Rosenhain expects to study the question of spring suspension in connection with motor vehicles and has planned visits to several spring factories.



Dr. Walter Rosenhain

World-renowned metallurgist who is in this country and plans to remain two months delivering a course of lectures

Oneida Truck Contracts to Make Russell Rail Car

GREEN BAY, WIS., Feb. 12—The Oneida Motor Truck Co., manufacturer of the Oneida truck, has made a contract with the Russell Co. of Kenosha, Wis., to undertake the production of the Russell gas-propelled railroad coach, the first demonstration models of which were built by the Winther Motors, Inc., of Kenosha, during the past year.

The Oneida works are starting work on six trains for the Russell company which has sold the units to a number of eastern steam railroad companies for short-line passenger and express service. In the past year fourteen Russell trains were installed. The trains are built in one, two and three units.

The power unit contains the engine plant, baggage compartment and smoking room, and is capable of drawing one or two trailer coaches. The engine plant is powered with a six-cylinder, 70 hp. Wisconsin engine and serves a four-wheel drive system. Standard railway trucks, air-brakes and other standard railroad equipment is employed.

DORT REPORTS INCREASE

FLINT, MICH., Feb. 15—Dort Motor Car Co. reports increased business in the first three months of its new fiscal year to average 161 per cent. Production plans at the factory have been adjusted to meet requirements of the business.

G. M. Distributing Bonus to Employees

Stock Disbursement Represents Accrued Portions of Awards for Four Years

NEW YORK, Feb. 15—General Motors Corp. is distributing to 6000 of its employees 270,000 shares of General Motors common stock and 7600 shares of the 7 per cent debenture stock. This distribution represents the accrued portions of the bonus awards under the plans of 1918, 1919, 1920 and 1922 made out of earnings from those four years.

The approximate value of the securities being distributed exceeds $4,500,000 at current market prices.

As a result of the operation of the bonus fund, one out of every eleven General Motors stockholders is an employee of the corporation and one out of every twelve employees is a stockholder.

Pierre S. duPont, president of General Motors, has written a letter to employees, in which is enclosed the stock certificates. In this letter he says in part:

Letter Accompanies Certificates

Five years ago, on July 26, 1918, the directors of General Motors Corp. approved a plan under which shares of stock, both debenture and common, are awarded to employees of the corporation in the form of bonus for conspicuous and meritorious service. The object of the plan is to recognize and encourage good service and to bring into the partnership of General Motors those whose efforts make the corporation successful.

The original bonus plan has been modified so that in the future stock awarded will be distributed one-quarter immediately and the balance in three annual installments. Also the matured installments of bonus heretofore awarded are to be distributed. In accordance with this modification certificates of stock are now being sent out to the bonus beneficiaries of 1922 and to those of other years as well.

Of stockholders who are also employees of the corporation many have received all or part of their holdings through the bonus plan. These employees are warmly welcomed to the partnership of stockholders, as their conscientious work, faithful service and accomplishment have added many thousands of dollars to the good will value of the shares to which they are so justly entitled. The annual report of the corporation, to be sent out shortly, should encourage all bonus stockholders to treasure these shares and to hold them as a permanent investment of which they will be proud and satisfied.

BROOKS-OSTRUK RECEIVER

NEW YORK, Feb. 13—Percival Wilds has been appointed receiver for the Brooks-Ostruk Co., Inc., manufacturer of automobile bodies here, by Judge Learned Hand. The action was brought by an equity proceeding instituted by the Consolidated Foreign Motor Car Co., Inc., with a claim of $8,000. The liabilities are stated to be $39,000 and assets $73,500.

Detroit Shows Gain in Retail Car Sales

January Increase Amounts to 195, Due to Greater Business Done by Ford

DETROIT, Feb. 12—Retail sales of new cars in Detroit during January totaled 2746 as compared with 2551 for December, a gain which was accounted for entirely, however, by increased sales of Fords which totaled 1416 as against the former month's 1148. In the other lines there was about an even split among companies in gains and losses, the whole evening up with the former month.

The effect of the Detroit show upon sales is not evident in the January totals as these represent only delivered cars upon which certificates of title were issued. A large number of cars sold at the show will not come into owner possession until February and March.

On the whole the show is regarded as returning business which January might otherwise have developed because of persons waiting for the show before buying. Closed car business in January exceeded open cars, 1419 to 1327. Ford open cars ran ahead of closed, 726 to 690. Chevrolet open cars were 204 to 159 closed; in the medium priced lines sales of closed cars far exceeded open models, Hupmobile, however, being an outstanding exception. Hudson and Essex business ran 93 to 11 in favor of closed models. Star car sales in January were 37 open to 22 closed.

Of a total of 434 trucks sold in the month 315 were Fords with GMC and Reo the only others to exceed twenty. About thirty trucks all told were sold in the heavy duty class.

Medium and Low Priced Cars Gain in New York

NEW YORK, Feb. 13—Medium and low priced cars showed a gain in sales in the metropolitan district during January as compared with the same month a year ago, but business in higher priced cars declined, according to the Automobile Sales Analysis issued by Sherlock & Arnold.

In the higher priced class sales aggregated 201 as against 283 a year ago. There were five makes of cars with sales in excess of twenty, three above ten and the rest tapered off gradually.

A better showing was made in the medium and low priced class, where sales reached 2814 for the month compared with 2014 in 1922 and 483 in 1921. Four cars were well in the lead with sales above the two hundred mark.

AUTOMOTIVE UTILITIES CHANGED

DETROIT, Feb. 12—The Automotive Utilities Corp. of Michigan has been taken over by the Automotive Utilities Corp. of America, a newly organized company with a capital stock of $1,000,000.

Officers are T. T. Hollinger, president; A. R. Thomas, vice-president, treasurer and general manager; R. T. Yeats, secretary; E. W. Soleau, assistant secretary and treasurer; Henry Laethem, A. J. Potter, directors. The company will make trailers and special bodies for Ford trucks and tractors.

Durant Motors Reports 237,000 Stockholders

NEW YORK, Feb. 14—Durant Motors added 12,642 "partners" to its stockholding family yesterday, a high water mark, which brings the total number of stockholders to 237,000. This rush is attributed to the fact that the sale of Durant stock at $15 is being withdrawn in several States, while in others it will follow shortly.

In a manufacturing way yesterday was also a red letter Durant day in that 523 Stars were produced in four different plants, the highest mark yet established in a single day. So far this month 3975 Stars have been turned out, and a total of 11,000 will be hung up for February. To date there have been 22,000 Stars manufactured, the mark at which the company is aiming being 231,000 for the year 1923.

Production of Flint and Princeton cars will start in April, it is announced, while the manufacture of Durant fours at Elizabeth is about to begin.

R. H. HACKNEY DIES

MILWAUKEE, Feb. 12—Robert Henry Hackney, inventor of the Hackney steel barrel and a pioneer in the pressed steel industry of the United States, with special reference to containers, died at his home in Milwaukee. After serving the Pressed Steel Car Co. in various executive capacities, Hackney returned to Milwaukee in 1901 and reorganized the Seamless Structural Co. into the Pressed Steel Tank Co.

FORD'S FOREIGN SALES

DETROIT, Feb. 14—Ford Motor Co. foreign sales in January totaled 10,988, a new mark for sales for that month, according to officials, and representing a generally improved business in all foreign assembly and service plants. Business abroad is reported showing marked improvement.

WINTHER ASSETS $1,308,000

MILWAUKEE, Feb. 12—Winther Motors, Inc., of Kenosha, Wis., has filed a voluntary petition admitting liabilities of $655,000 and claiming assets of $1,308,000. The action followed the appointment of a receiver.

WILLS NEW MODELS TO WAIT

DETROIT, Feb. 10—Manufacture of the new models introduced by C. H. Wills & Co. at the national shows in New York and Chicago will not be undertaken during the period that the company is in receivership.

Parenti Motor Plant Will Be Sold April 2

Sale, However, Is Dependent Upon Possible Reorganization of Company

BUFFALO, Feb. 12—Federal Judge J. R. Hazel has directed the sale of the Parenti Motor Car Co.'s plant and assets to the highest bidder on April 2 at 10 o'clock a.m. The lowest bid admissable is $240,000. If the stockholders reorganize the company before that time, there will be no sale. The stockholders also have an opportunity to enter bids for the property.

Should the assets, including the patent on the Parenti motor car, pass into the hands of an outside company, Ralph S. Kent, attorney for the stockholders, said today that the certificates in the company will never be of value. Investors numbering 11,000 put $1,300,000 into the concern.

The automobile company is now indebted to the extent of $530,000, of which $395,000 is in dispute, according to Kent.

Property Appraised at $243,000

"The company could be reorganized with $120,000 under the proper management," Kent told the court. He remarked later that the stock promotion company which sold the Parenti certificates was paid $735,000. Suit is now pending, according to Kent, for another $295,000 share in the total cash realized on the sale of stock. The property has been appraised at $243,000. There is also $35,000 in cash on hand in the Marine Trust Co., Kent said.

Judge Hazel set aside the sale of the company to the Hanover Motor Co. of Hanover, Pa., for $225,000.

David Meyers, representing the Hanover company, opposed the addition of $10,000 to the original price which the receivers asked as reimbursement for maintaining the plant since last summer.

"The Hanover company is ready to spend $100,000 to test the value of the Parenti patents," Meyers told the court.

Judge Hazel ordered creditors to present their claims within the next thirty days for confirmation.

Ford Buys Allegheny Plate Glass Factory

DETROIT, Feb. 15—The Ford Motor Co. has bought the plant of the Allegheny Plate Glass Co. at Glassmere, Pa., and will use it exclusively for the manufacture of glass for its product.

The factory has been rebuilt since 1919 and is said to be one of the most modern in the world, all machinery being electrically controlled. It is located on a site of forty acres, employs 500 workmen and is reported to produce about one-tenth of the plate glass of the United States.

Compromise Reached in Goodyear Suits

Leonard-Kennedy Co. Contract Remains in Force Minus Bonus Provision

(*Continued from page* 348)

Goodyear's reorganization was consummated at the crisis of a series of business setbacks and under trade conditions so acute that the company was faced with the dire alternative of a receivership and its stockholders with great loss to their equities.

The refinancing, while seemingly drastic and costly, was vitally necessary to procure a very large amount of new money from investors who would make no new investments in Goodyear save on assurance of yields substantially better than the then prevailing high rates on many well-seasoned securities. In consequence of the reorganization, the company was saved from disaster and a program consummated under which the equities of the stockholders might be and are now being rapidly restored.

Reorganization Constructive

Under all these circumstances the reorganization was a decided accomplishment of real constructive merit, not only to Goodyear, but to the general industrial situation that was then most seriously threatened.

After a year and a half of real progress in the rehabilitation of the business, the present litigation was started. Judge Ahern's decision has now ended that litigation and settled all the matters on a sound business basis. While deciding that all the securities issued in the reorganization are legal and valid, he has approved and ordered carried out a plan arrived at by the parties under which the company will retire substantial blocks of its prior preference stock at a favorable price in addition to other important savings, and the way is now clear for the continued progress of the company and the increase in value of its stocks and securities commensurate with that progress.

Changes Benefited Stockholders

In the post-reorganization period up to date, many material changes have occurred —all inuring to Goodyear's benefit and particularly to the interest of holders of preferred and common stock. In addition to the regular retirement of bonds and debentures, the company has retired $9,902,500 prior preference stock, and will retire an additional $5,000,000 thereof within twelve months. The purchase by the company at less than par of the prior preference stock already retired and the additional stock to be retired, plus the cancellation of accrued dividends thereon to Jan. 1, 1923, will effect a reduction of charges prior to the preferred and common of $4,280,360. In addition thereto, management stock fees amounting to $30,000 per year will be cancelled and the cost of management has been reduced from a possible maximum of $750,000 per year to $250,000.

The peak amount outstanding of bonds, debentures and prior preference stock issued at reorganization and senior to the preferred and common stocks was $87,402,500. On March 15, 1923, the aggregate outstanding of the same issues will be $72,750,000, or a reduction from the peak of $14,652,500.

On March 15, 1924, with the retirement of the additional $5,000,000 prior preference stock completed, and regular retirements of bonds and debentures, the aggregate of the three senior securities outstanding should be $64,750,000, or a reduction from the peak of $22,652,500.

At that time, viz., March 15, 1924, the year's current disbursements on account of interest and dividends on bonds, debentures and prior preference stock, and retirement charges on all three issues, should aggregate $9,080,000. Of this total, $3,600,000 will be in retirement of debt or stocks senior to the preferred and common, and therefore result in an equivalent addition to the book value of these junior stocks.

The total annual charges for interest, dividends and retirement of these three senior issues aggregated at the peak $10,292,200, so that the net result on March 15, 1924, should be a reduction of annual charges prior to preferred and common stocks of approximately $1,212,200, with further automatic reductions each year thereafter.

Common Understanding Reached

While the litigation has reflected the contrary opinions of many factions and persons interested in Goodyear, it is agreed that the welfare of Goodyear and its stock and security holders has been and now is the real goal of all. A common understanding is now reached by which all individuals and groups will henceforth unite in action and purpose in the aggressive, harmonious and loyal support of the company and its organization. To facilitate this, arrangements have been made between all parties interested in the company whereby the common and preferred stockholders of Akron will have an additional membership of three on the Board of Directors, of which Mr. H. B. Manton will be one.

It is the unanimous opinion of all those joining in this statement that the present management, installed in 1921 under the leadership of Mr. Wilmer as President, has shown its complete ability to conduct the business efficiently and well. Its accomplishments during a trying period of business reconstruction warrant, and should receive, the decided commendation and approval of every one interested in Goodyear.

This statement is signed by the following:

H. B. Manton, John Sherwin, J. R. Nutt, R. C. Hyatt, G. M. Stadelman, Chas. A. Stillman, Luther Day, J. P. Catton, Ralph Van Vechten, R. L. Robinson, Francis Seiberling, H. H. Springford, A. A. Schlesinger, Robert C. Schaffner, P. W. Litchfield and A. H. Scoville.

Seeks to Block Settlement

AKRON, Feb. 13—Former Mayor W. T. Sawyer of Akron, a stockholder in the Goodyear Tire & Rubber Co., filed suit today in the United States District Court at Cleveland to block settlement of the six suits brought by other stockholders attacking the legality of the Goodyear refinancing and reorganization program.

He demands the refund of the $308,082 bonus paid the Leonard Kennedy Co. and asks a court injunction restraining the Common Pleas Court of Akron from consummating the settlement as agreed upon through compromise on the grounds that such settlement is detrimental to the interests of the stockholders of the company.

Senate Gets S. A. E. Fuel Economy Views

Society Tells Investigating Committee Factors That Would Aid Conservation

NEW YORK, Feb. 12—The research department of the Society of Automotive Engineers has forwarded to Washington a statement for the consideration of the La Follette Senate committee which is investigating the gasoline situation.

The society, after reviewing the automobile situation and the development of motor cars, declares that fuel conservation can be had by improved carburetion, improvement in gasoline, better engines and education of the user of cars. The several factors which promote fuel economy, it says, may be summarized as follows:

Summary of Factors

(1) Universal adoption of means for maintaining the engine and the carburetor and intake system at the best operating temperature.

(2) The adoption as rapidly as possible of carbureting devices which can be adjusted once and for all by the maker to supply automatically a correct amount of fuel as completely atomized as possible for economical operations under all conditions.

(3) An economically correct grade of gasoline supplied uniformly throughout the country but suitably varied, if possible, to meet climatic conditions. Uniformity of fuel would go far to make possible the adoption of the more economical carbureting systems.

(4) Education of the user of motor vehicles to the advantages which will accrue to him through fuel economy. These advantages are in reality much greater than the saving in fuel cost. They include also less wear on the engine, less carbonization, less upkeep cost and freedom from other minor annoyances.

(5) The gradual adoption of engines using higher compression ratios with resulting higher fuel economy. This can be accomplished only as improvements in design or in quality of fuel make higher pressures possible without engine knock, which at present limits the useable compression pressures.

(6) Servicing of automotive equipment to maintain it in satisfactory condition for economy of operation. This refers to the entire vehicle as well as the engine, and present conditions can be improved by education of the public and of the garage mechanic, and by improvements in the service facilities offered by the dealers.

S. A. E. Studying Problem

"All of these factors, except, perhaps, the education of the general public, are receiving a continually increasing amount of study by the Society of Automotive Engineers and the manufacturers, and we believe that much has already been accomplished in eliminating fuel waste," the statement concludes.

"The necessity of meeting popular demands inconsistent with economy, and the difficulty of putting new developments into immediate production, have retarded this accomplishment."

Production of Tires Increased Over 1921

Casings, Tubes and Solids All Showed Marked Gain During Past Year

NEW YORK, Feb. 14—Figures compiled by the Rubber Association of America for the Bureau of Foreign and Domestic Commerce show an increase during 1922 over 1921 in the production of pneumatic casings, inner tubes and solid tires.

Total production of casings in 1922 was 30,698,139, as against 21,819,775 in 1921. Last year 38,137,181 inner tubes were produced as against 27,102,206 in 1921. Total production of solid tires in 1922 was 786,603 and in 1921 424,252.

November showed an increase in the inventory of pneumatic casings over October with a greater output but fewer shipments, while December showed a decrease in inventory and production but an increase in shipments.

Inner tubes' inventory was greater in November than in October with production running higher and shipments showing a decline. Inventory was reduced in December, shipments increased and production fell off.

With solid tires inventory was greater in November, production showed a slight increase and shipments declined. In December there was a further gain in inventory with an increase in shipments but a falling off in production.

A comparative table of inventory, production and shipments is as follows:

PNEUMATIC CASINGS

1921—	No. Mfrs. Reporting	Inventory	Production	Shipments
Jan.	45	5,319,605	703,430	965,417
Feb.	45	5,193,018	819,892	1,073,756
Mar.	46	4,597,103	1,163,314	1,614,651
April	49	4,527,445	1,651,418	1,785,951
May	59	4,451,668	2,100,917	2,085,882
June	63	4,154,456	2,313,265	2,643,850
July	63	3,892,037	2,570,524	2,757,581
Aug.	66	3,934,853	3,043,187	2,894,442
Sept.	63	3,340,798	1,929,268	2,047,929
Oct.	64	3,545,030	1,928,271	1,675,169
Nov.	64	3,908,342	1,756,555	1,342,519
Dec.	64	3,696,519	1,839,738	1,980,264
1922—				
Jan.	66	4,174,216	2,055,134	1,596,806
Feb.	66	4,691,329	2,084,308	1,562,365
Mar.	63	5,183,286	2,645,790	2,073,963
April	65	5,464,336	2,401,187	2,086,651
May	65	5,523,095	2,721,503	2,639,273
June	64	5,042,147	2,838,890	3,133,260
July	63	4,834,106	2,476,636	2,695,095
Aug.	63	4,629,392	2,905,209	3,029,823
Sept.	64	4,612,037	2,504,744	2,502,106
Oct.	64	4,682,958	2,674,662	2,588,770
Nov.	62	4,964,976	2,733,134	2,379,708
Dec.	59	4,599,208	2,656,942	2,934,079

INNER TUBES

1921—	No. Mfrs. Reporting	Inventory	Production	Shipments
Jan.	47	5,586,163	740,824	1,042,617
Feb.	46	5,415,464	916,627	1,129,881
Mar.	48	5,044,861	1,346,483	1,643,690
April	51	4,916,772	1,762,122	1,983,571
May	57	4,751,880	2,210,040	2,342,567
June	60	3,835,098	2,359,928	3,232,673
July	61	3,122,815	3,020,981	3,603,248
Aug.	64	3,649,319	4,430,152	3,804,060
Sept.	62	3,827,830	3,274,822	2,645,758
Oct.	64	4,732,016	2,843,918	2,016,371
Nov.	63	5,203,568	2,126,211	1,540,299
Dec.	64	4,731,021	2,070,098	2,522,710
1922—				
Jan.	66	5,246,647	2,343,393	1,889,724
Feb.	65	6,141,956	2,596,774	1,702,583
Mar.	63	6,991,118	3,017,511	2,090,737
April	65	7,230,096	2,650,573	2,329,343
May	65	7,189,552	2,970,696	2,938,947
June	64	6,186,534	3,130,629	3,973,679
July	63	5,675,839	3,068,199	3,630,744
Aug.	63	5,207,228	3,808,224	4,220,055
Sept.	64	5,164,757	3,501,442	3,558,971
Oct.	64	5,488,033	3,787,758	3,420,680
Nov.	61	6,210,053	3,850,908	3,075,023
Dec.	59	5,732,125	3,411,074	3,825,949

SOLID TIRES

1921—	No. Mfrs. Reporting	Inventory	Production	Shipments
Jan.	12	303,753	21,220	29,116
Feb.	12	304,374	23,365	29,599
Mar.	12	283,800	28,710	43,926
April	12	269,985	28,859	42,080
May	12	264,663	35,156	40,122
June	11	240,336	28,395	49,867
July	11	220,003	35,123	55,678
Aug.	11	216,367	55,694	66,866
Sept.	11	161,832	37,441	50,276
Oct.	10	163,299	46,274	45,911
Nov.	10	173,451	43,537	34,556
Dec.	10	168,515	40,478	39,520
1922—				
Jan.	11	181,769	40,224	33,294
Feb.	11	183,448	39,492	36,805
Mar.	11	182,197	49,433	48,350
April	11	173,748	46,664	52,309
May	11	170,904	57,640	60,711
June	11	169,808	66,089	63,408
July	11	176,375	71,505	60,425
Aug.	11	189,698	84,313	69,435
Sept.	11	200,016	82,767	66,797
Oct.	11	213,942	85,480	71,275
Nov.	11	234,684	85,775	61,466
Dec.	10	244,061	77,221	64,570

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as domestic stock.

"Shipments" includes only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch or on a consignment basis.

CAR AND RELIGIOUS LIFE, ESSAY THEME

WASHINGTON, Feb. 14—The Highway Education Board announces that "The Influence of Highway Transport upon the Religious Life of My Community" will be the subject of this year's essay contest.

The prize is the H. S. Firestone University Scholarship, which is valued at not less than $4,000, and is intended to defray tuition and all other reasonable expenses for a course at any college or university the successful contestant elects to attend. All students of high school grade are eligible.

TIRES HIGHER IN CANADA

WASHINGTON, Feb. 15—A report by the American Consul at Kingston states that advances in the prices of automobile casings and tubes have been announced by Canadian manufacturers. Tubes show an increase of from 5 to 25 per cent, while casings have advanced from 5 to 7½ per cent.

STAR RUBBER PRICES ADVANCE

AKRON, Feb. 12—Prices on tires and tubes have been advanced by the Star Rubber Co., dealers' prices going up about 5 per cent and consumers' from 8 to 10 per cent. The company expects to double its 1922 production this year.

U. S. Chamber Votes for Transport Study

Coordination Plans Taking Definite Shape—Automotive Industry Will Assist

(*Continued from page* 345)

efficiently in a certain territory, now served by a short line railroad reporting annual deficits, the most logical step would be to abandon the latter. Likewise if an electric carrier contemplated a line into a region which could be adequately served at a lower cost by a system of highway transport, the recommendations of the committee for motor transport, would undoubtedly discourage the establishment of an electric line.

That railroad officials generally expect increased competition from motor transport is easily apparent. Interested railroad executives show that the short line railroads are succumbing to the competition rather than be absorbed by larger roads or totally discontinued. The rail carriers prefer compromise with motorized competitors. It is the concensus of opinion among railroad executives that efficient motor truck service at reasonable rates lies within a radius of twenty-five miles, and for such service from point of actual shipment, to the consignee's door, the railroads cannot compete. In a recent interview the president of a short-line railroad said:

Rail Head Recognizes Truck

We may as well make up our minds that the motor-truck has come to stay, and that the good-roads campaign of construction will be continued until the desires of every section of the country in this respect are satisfied. It is good business policy, therefore, for railroad managers to accommodate themselves to the new order of things and make the best of it.

This involves recognition of the public usefulness of motor-truck transportation for limited distances, with confident realization of the fact that no other form of transport can compete with the steam (or perhaps, ultimately, the electrified) railroad for long hauls.

Motor transport is interesting an increasing percentage of the population because it serves its purpose better than the railroad, and this is an age of progress. If the service hitherto given by the short line railroads can be better performed, in shorter time and more conveniently to shipper, consignee or passenger, by the operation of motor vehicles on the highways, there is nothing left for the competing railroads to do but accept the situation or so improve their methods and facilities as to render like service.

FRANKLIN PHAETON BODY

SYRACUSE, N. Y., Feb. 14—A new Franklin phaeton body is now in regular production and deliveries have already started to dealers. No changes are made in the chassis, but the body is more roomy, the rear seat being somewhat wider with a total of 6 in. more length in the body. The price is $1,950.

INDUSTRIAL NOTES

Miller Spouting Co. of West Bend, Wis., established about four years ago to manufacture patented flexible couplings, metal hose, grain spouting, etc., is now specializing in the production of aluminum hub caps for motor vehicles. It has orders necessitating a night shift since Feb. 1. Ample supplies of aluminum sheets have been received to insure maximum output. The principal customers for hub caps include the Kissel of Hartford, Mitchell at Racine, Dort at Flint and other passenger car builders.

Tractor-Train Co., maker of Moore transmissions, has taken over the Rocky Mountain Steel Products, Inc., manufacturer of Rocky Mountain brakes and six-speed transmissions for Ford cars and trucks, and will continue to manufacture and market the Tractor-Train Co. products. Rocky Mountain Steel Products, Inc., is a closed corporation. The originators of the Tractor-Train Co. constitute the board of directors and officers of the new company.

New England Auto Products Corp. has been formed at New Haven, Conn., by Albert L. Perkins, and George McCombe of Hartford and James E. Schall and Charles E. Mitchell of New Haven. The company starts out manufacturing automotive replacement parts but will branch into other lines.

Longdin-Brugger Co., Fond du Lac, Wis., manufacturer of the "Close-Tite" passenger car top, principally for Ford phaetons and roadsters, is planning enlargement of its equipment to increase its output 25 to 50 per cent. In 1922 the production was somewhat in excess of 5,000 units.

American Engineering Co. of Philadelphia has taken over the Standard Crane & Hoist Co. and the patent and manufacturing rights to its mono-rail electric hoist. H. S. Valentine, chief engineer of the latter company, will direct the sales and supervise the manufacture of the hoists.

Midwest Rubber Manufacturers' Association has moved its offices from 607 South Wabash Avenue to 64 West Randolph Street, Chicago.

HARVEY SPRING TO ENLARGE

RACINE, WIS., Feb. 12—Preliminary plans for effecting a material increase in the capacity of the Harvey Spring & Forging Co. of Racine, Wis., are being considered by the directors, who recently largely increased the capital stock to provide for enlargement. The concern manufactures springs both for the passenger car manufacturing industry and for jobbers and dealers stocks for replacement.

HINKLEY REINSTATES "B"

ECORSE, MICH., Feb. 12—Renewed production of the United States Quartermaster Class "B" engine is announced by Hinkley Motors, Inc., due to the revival of demand brought about by the steady development of the heaviest type of haulage equipment.

BARTON AXLE TO BE SOLD

MILWAUKEE, Feb. 12—An order directing Henry J. Driessel, receiver, to sell all of the property of the defunct Barton Axle Co. of Barton, Wis., on May 12, 1923, has been entered by the Circuit Court at Fond du Lac, Wis. The receivership proceedings were instituted in December, 1921.

The order fixes the minimum bid at $80,000 and a cash deposit of $25,000. The sale is to be held at the offices of the plant and will be in two parcels. The first includes the factory and equipment and three acres; and the second, a 27-acre tract near by with miscellaneous improvements.

The Barton concern was established in the spring of 1919 and for a time manufactured motor vehicle axles and other units. F. C. Eppley is chairman of the creditors' committee.

Wisconsin Truck to Make Super-Traction Product

MADISON, WIS., Feb. 12—The Wisconsin Truck Co., recently incorporated here, to manufacture commercial cars for heavy duty and special purposes, has enlarged upon its original plan, following the closing of a deal with the Super-Traction Truck Co. of Fox Lake, Wis., to take over its production.

The Fox Lake company makes a six-wheeled truck, with a double set of rear wheels, for extra heavy loads and long wheelbases, as for large-capacity motor buses. The Madison company has increased its capital and is doubling its factory to handle the new department, which has a single contract for 500 six-wheeled chassis for use in the Oklahoma oil fields.

The Wisconsin Super-Traction Truck Sales Co. of Milwaukee, has been incorporated by F. N. Pettigrew of Fox Lake, designer of the six-wheeled chassis. This company will handle the general sales of the Madison factory, of which C. W. Kenniston is chief engineer.

Harrisburg Corp. Buys Stanley Spring Patent

CHICAGO, Feb. 7.—A. J. Dilley, an automotive spring engineer, has sold a controlling interest in the patents known as the Stanley automobile springs, to the Harrisburg Corp. of Harrisburg, Pa., for $115,000. These springs are distinguished by a self-oiling device at the end of each leaf. In addition to the price for the controlling interest in the springs, Dilley retains an interest in the new manufacturing company.

The Harrisburg Corp. has been recently organized by business interests at Harrisburg to take over the manufacture and replacement market of these springs, which heretofore have been manufactured only by the Garden City Spring Works, Chicago.

Dilley's patents were granted in 1913 and reissued in 1917 after considerable litigation, and, without particular sales effort, the springs have found a considerable replacement market. The distinctive point is a disk stamped in the end of the leaf with two oil holes leading to a piece of felt placed inside the disk. Capillary attraction conveys this oil between the leaves of the spring.

METAL MARKETS

Quotations covering the major steel products entering into automotive consumption, as published in current market reports, have become meaningless in so far as applying to fresh business. Sheet mills are either unwilling to commit themselves at any price, or, when they do assume second quarter obligations, prices represent a considerable advance over publicational quotations. Non-integrated rollers encounter great difficulty in obtaining sheet bars. The paucity of sheet bar offerings has been interpreted in some quarters as a "steel famine." It would seem that such a conclusion misrepresents the real condition in the sheet bar market. There is a marked dearth of sheet bars at $38.50.

There are some avowed sellers at $40, and if consumers would concede that level to be the market, the scarcity of offerings would soon give way to a normal supply. The non-integrated sheet rollers are between the upper and nether millstone. On the basis of their present commitments and the nominal quotations by which buyers are guided to a large extent in their bids when offering mills new business, non-integrated rollers can ill afford to accede to the price views of sheet bar producers. It is for this reason that several valley rollers have suspended pending more settled conditions in the sheet bar and sheet market.

These seemingly untoward conditions are an indication of the market's healthy condition. With buyers eager not only to place contracts but ready to furnish specifications, and with basic conditions justifying an upward revision of the prices for most steel products, a runaway market could be easily conjured into being were it not for the conservative attitude of both producers and consumers. The former while eager for higher prices, so as to offset the higher costs which can not be eliminated at this time, seem to recognize the danger that lurks in too high prices, and the latter while anxious to cover their requirements are not committing the mistake of running prices up on one another. Rolled products other than sheets are also moving toward higher levels. Merchant bars, held at the uniform price of 2 cents in December, have advanced $2 to $4 per ton over that level and the trend is toward still higher levels.

Pig Iron.—Gradual, although very slow liquidation of coke prices appears to be under way. There are those melters of pig iron who believe that this downward readjustment is bound to have its effect on pig iron prices. Others apparently hold a different opinion and these have been buying freely for March and second quarter shipment in the last few days. Automotive foundries in the Middle West have taken on fair-sized tonnages for second quarter deliveries. Blast furnace interests claim to have inquiries for third quarter iron, but say they are not eager for so long deferred business unless it is accompanied by attractive second quarter orders.

Aluminum.—The market has turned very quiet. Automotive consumers appear to be fairly well covered and importers have very little metal to offer. Rumors of further advances by the domestic producer persist, but there appears no other basis for these constantly recurring reports than that holders of speculative lots would like to see such an advance which would enable them to liquidate part of their holdings at a profit.

Copper.—Producers are satisfied to let the market have a rest at prevailing price levels. Second hands offer metal a shade below producers' quotations.

FINANCIAL NOTES

Edmunds & Jones Corp's. consolidated balance sheet as of Dec. 31 shows a net income for 1922 of $390,529.39, after provision for Federal tax, increasing the gross surplus to $1,446,220. Dividends paid during the year totaled $115,090, which, with adjustments to capital account, made the balance at the year's end $1,302,868. Assets total $2,410,624 and liabilities $1,107,755. Assets include: cash, $173,004; receivables, $389,781; inventories, $730,792; investments, $57,400; plant accounts, $1,009,987 and deferred charges, $49,657. Orders on hand total approximately $1,100,000 for which sufficient materials are now on hand or have been contracted for at present market prices. Sales in 1922 exceeded $4,200,000, an increase of approximately 50 per cent over 1921; net profit is over four times that of the previous year. Additions to property and plant in 1922 totaled $217,614. The outlook for 1923 is declared very favorable and results are expected to surpass the year just closed.

C. M. Hall Lamp Co. shows total assets of $1,690,898 and surplus of $562,605 in its balance sheet as of Dec. 31, last. Current assets aggregate $1,150,548 and current liabilities, $44,070. Current assets comprise cash, $52,595; United States Treasury certificates, $250,000; Liberty bonds, $50,000; municipal bonds, $92,000; real estate bonds, $45,000; accounts receivable, $200,812; bills receivable, $12,557; accrued interest $5,197 and inventories, $2,441,355. Plant investment totals $534,843 after provision of $294,416 for depreciation. Capital stock is $1,000,000 all in one class.

Continental Guaranty Corp. as of Dec. 30, 1922, shows assets of $12,651,403, of which $1,757,167 is cash. Among the assets listed are $6,813,252 in motor lien retail time sales notes, of which $70,509 are over sixty days past due; $872,812 motor lien storage notes and acceptances, none of which are over sixty days past due, and $2,301 in repossessed cars. The capital stock of the company, which specializes in automobile financing was acquired by the Commercial Credit Co. of Baltimore last October.

Barley Motor Car Co. is negotiating with New York and Grand Rapids brokers for the sale of probably $500,000 of its preferred stock, according to President A. C. Barley. Arrangements are expected to be completed within thirty days. When the Roamer Motor Car Co. was reorganized and expanded it had $1,000,000 preferred and 50,000 shares of common stock in its treasury. The sale of the preferred stock is for the purpose of providing additional capital for contemplated expansion of the business.

Waltham Watch Corp. of Waltham, Mass., has been incorporated under the laws of Massachusetts with a total authorized capital stock of $6,700,000, represented by 17,000 shares of 7 per cent cumulative prior preference stock and 50,000 shares of 6 per cent preferred, all of $100 par; also 25,000 shares of Class A and 120,000 shares of Class B common, both of no par value.

J. G. Brill Co. reports sales and other income of $10,177,582 in 1922 against $7,467,898 in 1921. Surplus, which was $634,368 after dividends, contrasted with a deficit of $157,200 in the preceding year. The amount of work on hand Feb. 1, 1923, was more than $11,000,000, compared with $2,233,000 at the same time last year.

Stewart-Warner Speedometer Co. reports net profits of $5,335,162 for the year ended Dec. 31, 1922, after depreciation charges and taxes. This was equal to $11.23 a share earned on the 474,800 shares of capital stock outstanding. In 1921 the earnings were equal to $2.19 a share. The surplus, after dividends in 1922, amounted to $3,692,024.

Federal Motor Truck Co. shows net earnings of $403,065 for 1922 in its annual report as compared with $178,800 in 1921. Current assets include: cash, $133,532; bills receivable, $720,542; inventory, $1,590,464 and investments, $239,401. Current liabilities include accounts and bills payable of $545,062.

Towson Body Co. reports net sales for 1922, December estimated, of $8,037,564 and net profits, before taxes and after depreciation and interest, of $757,197. Earnings are now running at the rate of $120,000 monthly. The company is producing about 1250 bodies a month, all inclosed, for Packard and Lincoln.

Reynolds Spring Co. directors have declared 1¾ per cent dividends on the preferred "A" and the preferred "B" stocks payable April 1 to stockholders of record of March 19.

Greenfield Tap & Die Corp. has declared the regular quarterly dividend of $2 per share on the preferred stock, payable April 2 to stock of record March 15.

Timken Roller Bearing Co. has declared the usual quarterly dividend of 75 cents a share, payable March 20 to holders of stock of record March 5.

Borg & Beck has declared the regular quarterly dividend of 50 cents a share on the common stock, payable April 1 to holders of record March 15.

Dunlop Has No Contract with Any Car Producer

BUFFALO, Feb. 13—Employment of more than 25,000 persons in the Dunlop Tire & Rubber Corp.'s River Road plant was predicted today by Sir Eric Geddes, chairman of the board of directors. Sir Eric arrived here with E. B. Germain, president of the American company.

"There is every reason to believe the Buffalo plant will be larger than our British factory, which gives employment to more than 23,000 men and women," Sir Eric said.

Germain stated that the sale of tires made in the Buffalo plant will begin about May 1. He announced that cord tires will be the only type manufactured here. No fabric tires will be produced. The Dunlop company has no contracts with Henry Ford or any other automobile producer, Germain said, in refuting rumors that Ford would absorb the entire output of the Buffalo factory.

"We will not seek contracts with manufacturers at this time," Germain said further. "We expect to market our tires through other channels."

WESTCOTT'S ANNUAL MEETING

SPRINGFIELD, OHIO, Feb. 14—Reports submitted at the annual meeting of the stockholders of the Westcott Motor Car Co. today showed that the company enjoyed a substantial increase in business in 1922

Officers and directors were elected as follows: President, B. J. Westcott; vice-president, E. H. Gilcrest, and secretary-treasurer, J. E. Rehe. The directors include the officers and H. G. Root, Pearl Grabill and R. A. Worthington.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

Last week the rate for call loans ranged between 4 per cent and 4¾ per cent, as compared with 4 per cent to 5 per cent in the preceding week. Greater ease developed toward the end of the week. The undertone was steady for fixed date money. The quotations, however, did not change from 4¾ per cent to 5 per cent for all maturities from sixty days to six months. The prime commercial rate remained unchanged at 4½ to 4¾ per cent.

The production of steel ingots for the month of January was at the yearly rate of approximately 43,500,000 gross tons, which is the highest rate since March, 1920. January's production showed a gain of 9 per cent over the rate for the last three months of 1922, a gain of 28 per cent over the average rate for last year and a gain of 126 per cent over the average rate for 1921.

Pig iron production for January, totaling 3,229,604 tons, was the largest since October, 1920. It was a gain of 4.6 per cent over December's output, and almost double the output for January last year.

Total bank clearings at principal cities of the United States for the week ending Feb. 8 aggregated $7,205,235,000, a gain of 2.5 per cent over the preceding week and 21.6 per cent over the corresponding week last year. Outside of New York City, the total was $2,838,235,000, an increase of 2.8 per cent over the preceding week and 22.1 per cent over the corresponding week last year.

The Federal Reserve statement as of Feb. 7, 1923, showed an increase of $266,000 in gold reserves, but a decrease of $7,779,000 in total reserves. Bills on hand decreased $31,563,000, and total earning assets decreased $32,174,000. Deposits declined $26,621,000 and Federal Reserve notes in circulation increased $14,116,000. The reserve ratio advanced from 76.9 to 77 per cent.

Dayton Rubber Reports $1,502,407 Quick Assets

DAYTON, OHIO, Feb. 13—The Dayton Rubber Manufacturing Co., at its annual meeting here, reelected all officers and directors, the only change in management being the selection of A. L. Freedlander, who has served as factory manager of the company for many years, as second vice-president.

Progress made last year and prospects for the coming year were outlined by John A. McMillan, president and general manager, who stated that total sales in 1922 represented the largest year of business ever experienced by the company.

The annual financial report submitted by Robert F. Brown, treasurer, showed $102,000 cash on hand with total quick assets of $1,502,407. Total assets, including land, buildings, patents, etc., were given as $4,533,517. The debt of the company was reported to be $681,277.

Calendar

FOREIGN SHOWS

March 31 - April 29 — Madrid, Spain, International Automobile Exposition at the Palacio de Exposiciones, showing automobiles, motorcycles, accessories and equipment, under the auspices of the Chambre Syndicale de l'Automobile et du Cycle.

May 9 - June 12 — Gothenburg, Sweden, International Automobile Exhibition, Sponsored by the Royal Automobile Club of Sweden.

Oct. 4 - 10 — Paris, Passenger Cars, Bicycles, Motorcycles and Accessories, Grand Palais.

Oct. 24-Nov. 2—Paris, Trucks, Agricultural Tractors, etc., Grand Palais.

RACES

May 10 — Berlin - Grunewald, German Grand Prix.

May 30—Indianapolis, Eleventh Annual 500-mile International Sweepstakes.

July 2 — Tours, French Grand Prix 500-mile race.

CONVENTIONS

Feb. 15 - 16 — Chicago, National Association of Taxicab Owners, Hotel Sherman.

Feb. 17—New York, American Engineering Standards Committee in the board room of the American Society of Mechanical Engineers, to discuss a safety code.

May 2, 3, 4 — New Orleans, Annual Convention of the National Foreign Trade Council.

May—New York. Annual Convention of the United States Chamber of Commerce.

Oct. 24-26—Cleveland, Thirtieth Annual Convention of the National Association of Farm Equipment Manufacturers, Hotel Statler.

S. A. E. MEETINGS

Metropolitan Section

March 15—Speaker, William P. Kennedy, President, Kennedy Engineering Corp.; Subject, Trolley Buses and Flexible Vehicles for Street Railway Service.

April 19—Speaker, Edw. E. La Schum, General Superintendent, Motor Vehicle Equipment, American Railway Express Co.; Subject, Engineering Features of Fleet Operation.

May 17—Speaker, F. P. Gilligan, Secretary, Henry Souther Engineering Co., Subject, Metallic Materials for Automotive Work.

Other Meetings

Feb. 20—Dayton Section—Alloy Steel Valves and the Effect of Heat on Various Steel Alloys — Robert Jardine, Dayton Engineers Club, 8 P. M.

Feb. 20—Pennsylvania Section—Lubrication — A. Ludlow Clayden. Engineers Club, Philadelphia, 8 P. M.

March 2—Meeting in the General Motors Building, Detroit, 8 P. M. — Recent Development in Paint and Varnish Chemistry—Valentine Pulsifer.

April 26-28—Cleveland Section—Automotive Transportation.

June 19-23—Summer Meeting of the S. A. E.—Spring Lake, N. J.

October—Production Meeting of the S. A. E.—Cleveland.

South Side Malleable Expanding Its Plant

MILWAUKEE, Feb. 12.—In order to meet the heavy demand for malleable castings from the automotive industries, which is now increasing steadily from the agricultural implement, tractor and other industries, the South Side Malleable Casting Co. is making extensive improvements in its works.

The principal item is a new annealing building, 180 x 240 ft., of brick and steel. The latest type of annealing oven equipment will be installed.

Among the company's largest contracts is one from the Studebaker Corp. Walter W. Lange is president and general manager of the malleable company as well as the Crucible Steel Casting Co., Milwaukee, which also is improving its capacity.

Increasing Force of Women

BEAVER DAM, WIS., Feb. 12.—Experience of the Western Malleables Co., Beaver Dam, Wis., in the employment of girls and women on piece work in its core-room has been so successful that the company is now erecting an additional core-room building, designed for female labor exclusively.

About 20 girls are employed in the present core-room and in planning to increase the number to 40 or 50, it was decided that segregation of male and female labor is desirable. In the new building the female workers will be away from the smoke, dust and dirt of the foundry, to which the present room is attached.

The Western company has tried the experiment of girl core-makers in the South Street plant only, which is devoted largely to the lighter castings for the automotive industries.

OKLAHOMA AUTO SOLD

OKAY, OKLA., Feb. 12—The Oklahoma Auto Manufacturing Co. has been sold to a syndicate of stockholders, headed by Dan L. Jones, vice-president and superintendent of the company, for $62,000 at a forced sale. It is understood that the plant will be put in operation at once.

The company manufactures trucks, trailers, farm tractors and commercial bodies. It was incorporated originally for $800,000, but later reorganized with a capital stock of $450,000, with W. R. Lantz as president and general manager. Financial troubles brought about the forced sale.

HARDING RUBBER AID LIKELY

WASHINGTON, Feb. 13—President Harding is expected to recommend to the Budget Commission that money be provided for an investigation into the possibilities for producing rubber in American territorial possessions. Funds also will be asked to carry on experiments in the cultivation of rubber in American insular possessions such as the Philippines. This is along the lines suggested by Secretary Hoover, who recently asked Congress to set aside a fund for this work.

TO EXPLOIT RUMPLER HERE

CHICAGO, Feb. 12—A copyrighted cablegram to the Chicago Tribune from Berlin says that the Darmstadter National Bank is authority for the statement that Rumpler and the American Steel Co.'s branch in Berlin have formed a joint stock company for the commercial exploitation of airplanes and automobiles in America. The car in question is the Rumpler, which is featured by carrying its engine in the rear.

LIMOUSINE BODY ELECTIONS

KALAMAZOO, MICH., Feb. 12—Optimistic predictions were made at the annual meeting of the Limousine Body Co., held here. All officers and directors were reelected as follows: President, J. D. Bobb; vice-president, W. B. Milham; secretary-treasurer, L. T. Bennett. In addition to the officers the directors are V. T. Barker, B. R. Barber, W. E. Kidder and George J. Putt.

Model Replies Used at Show in Chicago

CHICAGO, Feb. 10—Gratifying results were obtained this year in connection with the second salesmanship contest conducted at the Chicago National Automobile Show by the Chicago Automobile Trade Association.

In the course of the interview, unannounced interviewers were to ask six questions, in substance as follows:

How is business?
Have prices reached the bottom?
What will you allow me for my used car?
With the new low prices have the manufacturers lowered the quality?
What is your opinion of the —— car?
Where is the —— exhibit?

The salesmen were supplied with cards containing model replies to these questions, as follows:

No. 1. Nineteen twenty-two was a banner year. Nineteen twenty-three should be better for the reason general economic conditions in other lines have greatly improved. There are now in use in this country over 12,000,000 motor cars. The replacement demand alone will require about 2,000,000 new cars this year.

No. 2. Better materials and workmanship will be found plus essential equipment. Prices are now lower than in pre-war period, therefore we feel they cannot go lower. The trend of the prices of steel and other basic material is now upward. No other industry has accomplished the same readjustment so effectively.

No. 3. Just what it will sell for, less conditioning and sales cost. New car price reductions have, of course, lowered used car values. We would like to appraise your car.

No. 4. No, they have not. On the other hand, the cars are vastly improved, as, for instance (cite the recent improvements on your own car).

No. 5. All cars are good now. (Refer to particular merits of your own car.)

No. 6. Each salesman was furnished with a diagram of the car spaces and was instructed to carefully and courteously direct inquirers to any other exhibit.

Other points considered in awarding prizes were the salesman's approach, his personal appearance, his general familiarity with the line he represented and his manner of concluding the interview.